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CORNUS CIRCINATA.

By Robert Gibson, Jr., Ph.G.

From an Inaugural Essay.

The bark used for my experiment was obtained from North Carolina, and I subjected it to the following process:

Two pounds of the bark in moderately coarse powder were macerated with cold water for twenty-four hours, and then transferred to a percolator and cold water poured upon it until the displaced liquid passed colorless and tasteless. The percolate obtained was of a deep red color, and showed by testing with the sesquichloride of iron, the presence of tannin, to deprive it of which the menstruum was treated by continuous agitation with the carbonate and the oxide of lead.

First used the carbonate and then the oxide, and found that the oxide detannated it much more readily. Then I used the oxide exclusively in detannating, then filtered it, and obtained a filtrate of a much lighter color and of a bitter astringent taste.

This menstruum was evaporated down to the consisteney of a soft extract, which was of a bright red-brown color and of a very bitter taste, and much more lasting than the taste left by the menstruum. Treated this extract with stronger alcohol, successively, until thoroughly exhausted of the bitter principle, and mixed the alcoholic solutions, and obtained an alcoholic solution containing the bitter principle, associated with some sugar and coloring matter, and an insoluble waxy-like mass as a residue which, on being dissolved in water and heated with a few drops of solution of sulphate of copper, solution of soda and sulphuric acid, produced the characteristic brown precipitate, showing the presence of sugar.

Then to the alcoholic solution added solution of subacetate lead in sufficient quantity to precipitate the coloring matter, then filtered it, and passed sulphuretted hydrogen through it to remove the lead; filtered,

then evaporated spontaneously to a thin syrupy consistence, agitated it with a mixture of stronger alcohol and ether, in the proportion of one part of alcohol in seven of ether, to remove the sugar and coloring matter, and after allowing it to stand for twenty-four hours, decanted the ethereal solution carefully into a beaker, and allowed it to evaporate spontaneously, when granular-like crystals of "Cornin" were obtained of a dark yellow color.

These were dissolved in a mixture of alcohol and ether, and recrystallized; treated them in this manner successively a number of times, each time with a separate portion of the mixture, and on finally recrystallizing, I obtained them of a much lighter color, but still having that dark yellow cast. Various other efforts were made, but unsuccessfully, to obtain them in a pure state; the coloration is due most likely to a great extent to the presence of tannin, of which, in the detannating process, it had not all been deprived on account of decomposition of the aqueous menstruum, occasioned by the temperature of the atmosphere and by the length of time required to fully accomplish the process.

The process adopted in this experiment was the one used, or rather the most practical of the three processes followed, by Mr. Frey, of "'79," in his investigations of Cornus Florida.

FUCUS VESICULOSUS.

By Frank Frisby, Ph.G.

Abstract from an Inaugural Essay.

Fucus vesiculosus belongs to the Cryptogamia Algæ in the sexual system, and to the natural order Algaceæ. This sea weed is perennial, with the frond or leaf flat, smooth and glassy, from one to five inches long and from quarter of an inch to one inch broad, with a midrib throughout its length, entire upon the margin, and of a dark olive-green color; small spherical vesicles, filled with air, are immersed in the frond near the midrib.

The plant grows upon the shores of Europe and of this continent, attaching itself to the rocks by its expanded woody roots. It has a peculiar odor, and a nauseous saline taste. Much that is offered as Fucus vesiculosus is quite different. Out of three specimens I procured only one was the true Fucus vesiculosus. The various sea weeds and Fucus nodosus should always be carefully discriminated from the genuine plant.

Quantitative Examination.—Amount of water, 2·26, calculated from 10 grams.

Amount of ash, calculated for the dried plant, 1·59.

Amount of ash soluble in water, ·924.

Amount of ash soluble in hydrochloric acid, ·675.

The watery solution of the ash was made up to 30 cc.

To 10 cc. of the solution a solution of 1 part ferrous sulphate and 2 parts sulphate of copper was added; a dirty white precipitate of cuprous iodide (Cu_2I_2) was formed; when washed and dried it weighed ·109 gram, showing = ·072 iodine.

To the solution, after removal of the iodide, a solution of nitrate of silver was added, which gave a white precipitate of bromide and chloride of silver. When washed, dried and fused it weighed ·427 gram. The double salt was then transferred to a light weighed bulb tube, and fused in the bulb. The mass was allowed to cool and then weighed. Through this a slow stream of dry, pure chlorine gas was conducted, and heat was then applied to the contents of the bulb to fusion, and the contents occasionally made to roll about by revolviug the bulb. After about 25 minutes the tube was taken off and allowed to cool. The tube was then held in an oblique position, that the chlorine gas might pass out and be replaced by atmospheric air, and then weighed. The tube was heated again in the same way and the process repeated until the two last weighings were the same. The fused mass, after treatment with chlorine, gave ·380 gram of pure chloride of silver. The difference between the mixed silver bromide and chloride and the chloride of silver was found to be ·047 gram.

The difference between the molecular weight of $\frac{Ag\,Br}{188}$ and $\frac{Ag\,Cl}{143{\cdot}5}$ = 44·5, thus giving ·198 silver bromide, ·084 bromine, ·227 silver chloride, = 0·56 chlorine.

Separation of Potash and Soda.—In this separation the two salts must exist as chloride. Therefore the bromide and iodide were converted by evaporating to dryness 10 cc. of the solution of the ash with hydrochloric acid in excess. The amount of double chloride of potassa and soda determined and found to weigh ·209 gram. This was dissolved in a little water, a concentrated neutral solution of bichloride of platinum added in excess, and evaporated in a porcelain dish nearly to dryness, at a very low heat. Spirits of wine was then added to the residue. This was allowed to stand for four hours. The undissolved last was then transferred to a weighed filter and washed with spirits of

wine, dried at 100°C. and weighed. Weight found to be ·390 gram. This gave ·061 gram potassium, and the sodium ·037 gram.

The hydrchloric solution was made up to 30· cc.

Estimation of Phosphoric Acid.—To 10 cc. of solution a solution of acetic acid and a solution of acetate of sesquioxide of iron was added, producing a white precipitate of ferric phosphate. When dried at a very low heat it weighed ·191 gram, thus showing ·120 gram phosphoric acid.

Estimation of Sulphuric Acid.—To 10 cc. of the solution barium chloride was added until no further precipitate was noticeable. The precipitate was allowed to settle, and the liquid decanted from it; it was then further washed by decantation, filtered, dried, and weighed ·080 gram, which indicates ·032 gram sulphuric acid.

Estimation of Calcium.—10 cc. of solution was evaporated nearly to dryness and treated with strong alcohol until the product dissolved. A slight excess of concentrated sulphuric acid was added, and the solution allowed to stand two hours. The precipitate was then transferred to a weighed filter, and washed with strong alcohol until the filtrate gave no acid reaction to test paper. After the removal of all the free acid the washing was continued with 40 per cent. alcohol until the filtrate left no residue on evaporation. The precipitate was then dried and weighed, and the process repeated until the last two weighings were the same, ·145, which shows ·042 calcium.

Estimation of Magnesia.—10 cc. of the solution was taken. The calcium was removed as oxalate. The solution was evaporated to about one-fourth and an excess of pure dilute sulphuric acid added; this was evaporated to dryness in a weighed porcelain dish, at a very low heat. The heat was gradually applied. The flame was made to play on the cover from above until there was no excess of acid, then agitated over a lamp; when cooled it weighed ·142 sulphate of magnesia, $\frac{MgSo_4}{120}$ indicating ·025 magnesia.

Summary.—

A	Water,	2·26
	Ash,	1·59
	Organic matter,	6·15 = 10·
B	Potassium chloride,	·348
	Sodium iodide,	·252
	Sodium bromide,	·324
	Magnesium phosphate,	·312
	Calcium phosphate,	·225
	Calcium sulphate,	·138 = 1·599

By digesting the drug in boiling alcohol, and filtering while hot, and allowing to cool, small, colorless, slender, needle-shaped crystals were obtained, found to be mannite. Out of 10 grams ·046 of mannite was obtained.

By distilling 10 grams of the drug ·012 of odorous oil was obtained. The decoction gave an acid reaction to test paper, but I was unable to obtain any free acid.

Medical Action.—I restricted myself to dieting, which consisted in excluding from my food as nearly as possible all carbonaceous substances. No excess of exercise; sunlight; no liquids of any kind that contained any carbon. I commenced taking the fluid extract; one drachm doses four times daily, before meals and at bedtime. This was continued for five days. From that time the dose was increased to two drachms; this continued for five days. (At this point my urine showed signs of coloration.) The dose was then increased to half an ounce; at the expiration of four days my urine was decidedly colored, and had an extremely offensive odor, and when permitted to stand a separation of fat could be seen on top. On the fifteenth day I found I had lost in weight 1½ pound, and on the twentieth day I had lost 4¾ pounds. The above experiments are all that I have so far made.

PRINOS VERTICELLATUS.

By Louis Clay Collier, Ph.G.

Extract from an Inaugural Essay.

A quantity of the bark was procured, carefully examined and found to answer perfectly to the description given in the National Dispensatory.

The bark was properly comminuted, packed in a cylindrical percolator and thoroughly exhausted with alcohol.

The alcohol was recovered by distillation, and the residue, which was evaporated over a water bath to a semi-fluid consistence, was of a dark green color and extremely bitter.

It was then repeatedly agitated with petroleum benzin, which upon evaporation yielded a "wax" containing all of the chlorophyll, and left a residue, which I shall denominate A, of a yellowish-brown color.

The wax was of a beautiful dark green and upon heating emitted an aromatic odor resembling that of yellow wax and of about the same consistence, soluble in alcohol, ether and oil of turpentine.

Residue A was then treated with ether as long as the ether was discolored.

The ether was distilled off, over a water bath, and the yellowish mass which remained was precipitated with water, which precipitate proved to be *resin* of a yellowish color, odorless, tasteless and pulverizable.

The resin, by repeatedly dissolving in alcohol and precipitating in water, was obtained nearly white; but still having a slight yellowish cast, and was soluble in alcohol, ether and chloroform.

Residue B was then treated with water, in which it was entirely soluble.

A portion of it was treated with Tr. sesquichloride of iron, producing a greenish-black precipitate; another portion gave with solution of gelatin a flocculent precipitate indicating the presence of *tannin*.

Oxide of lead was then added to the whole solution, evaporated to dryness, redissolved in water and the excess of lead precipitated by sulphuretted hydrogen, and filtered.

To a small quantity of this solution was added a solution of potassic mercuric iodide; this, however, did not give a precipitate, thus showing that the bark does not contain an *alkaloid* as has been heretofore supposed.

Another portion of this solution, treated with Trommer's test, gave a red precipitate, showing presence of *grape sugar*.

To remove this sugar considerable difficulty was experienced; agitating it with a mixture of two parts ether and one of alcohol and allowing it to subside, decanting the clear liquid, and repeating the operation until on evaporating a portion no residue remained.

Upon evaporating this solution to dryness, and redissolving in water, it still gave reaction with Trommer's test showing grape sugar.

Subacctate of lead was added to the solution precipitating the bitter principle, leaving the sugar in solution.

The precipitate was thoroughly washed and diffused through water, the lead precipitated with sulphuretted hydrogen, filtered, and evaporated to dryness. It was then redissolved in water, purified animal charcoal added and again carefully evaporated to dryness.

This was exhausted with boiling alcohol and concentrated.

On allowing some of the bitter alcoholic solution to evaporate spontaneously, crystals of *cane sugar* were obtained.

The *bitter principle* was found deposited as an amorphous yellow powder.

An aqueous solution of the bitter principle gave reactions with the following reagents:

Perchloride of platinum gave a dark red precipitate, becoming brown on boiling.

Nitrate of silver gave a white precipitate, changing on boiling to red and on cooling to a chocolate color.

Protochloride of tin gave a white precipitate, changing to brown on boiling.

Bichloride of mercury gave a white precipitate, becoming reddish-brown on boiling.

Antimoniate of potassa, heavy white precipitate, changing yellowish-brown on boiling.

Concentrated mineral acids produced heavy a white precipitate.

Caustic alkalies, cinnamon-brown coloration.

The bark, which had previously been exhausted with alcohol, was percolated with water; this percolate, on boiling a short time and allowed to cool, threw down a flocculent precipitate, showing the presence of *vegetable albumen*.

This was filtered out and the filtrate precipitated with alcohol, which proved to be gum.

A decoction of the exhausted bark was made; on being treated with solution of iodine produced blue coloration, which disappeared on boiling; this indicated the presence of *starch*.

VIBURNUM PRUNIFOLIUM.

By Herman Van Allen, Ph.G.

From an Inaugural Essay.

Viburnum prunifolium, natural order of Caprifoliaceæ, indigenous to North America. The bark of the root is found in pieces about two inches long and one inch wide externally, reddish-brown, lighter internally, breaks with a short fracture, is without odor, and of a very bitter taste.

Of the bark collected in June four ounces, in moderately fine powder, were percolated with stronger alcohol; the tincture evaporated to a syrupy consistence gave a dark green residue, of a very bitter taste; treatment with benzin removed a small portion of fatty matter, of a

dark green color, and ether afterwards dissolved a small portion of bitter principle. On evaporating the residue, it was found to be readily soluble in water, the solution giving no reaction with gelatin, but with salts of iron a dark green color was produced. Only a small portion of the bitter principle was found to be soluble in chloroform.

The aqueous extract was treated with acetate of lead, but only a small portion of coloring matter was removed, the resulting liquid being of a light brown color. To this sulphate of sodium was added, evaporated to dryness, and the bitter principle taken up with stronger alcohol, which on evaporating left a syrupy liquid of a very bitter taste.

Finding it impossible to obtain the bitter principle pure, the following course was tried: Two pounds of bark on being exhausted with stronger alcohol gave a dark brown percolate, to which, on evaporating, acetate of lead was added, and by filtering, a portion of the coloring matter was removed. To this filtrate sulphate of sodium was added, and evaporated to dryness, and bitter principle taken up by alcohol fortior; percolation through animal charcoal failed to remove any of the color. This alcoholic solution was then evaporated to dryness, dissolved in water, and again treated with animal charcoal, when a portion of the coloring matter was removed, but the percolate was still slightly colored. A small portion was evaporated and treated with ether and chloroform, but nothing was taken up by these solvents. The aqueous percolate was then treated by dialysis, and the resulting liquid was found to be still slightly colored, very bitter, and to give a copious precipitate with Trommer's test for sugar. Various solvents were used to obtain the bitter principle free from the sugar, such as a mixture of equal parts of alcohol and ether, stronger ether, benzin, chloroform, carbon bisulphide, or to precipitate it with mercury bichloride, but it was not affected by any of these reagents. It is probably a glucoside, or allied sugar. The alcoholic solution gave negative results with the general tests for alkaloids.

Examination of Coloring Matter.—That portion which was precipitated by acetate of lead was dissolved in boiling water; sulphuretted hydrogen gas was passed into this, giving it a dark red color; this was continued as long as a precipitate was produced, then filtered and evaporated to dryness and dissolved in water, when it gave the following results: With solution of gelatin, a light brown precipitate of tannin; with chloride of iron, a greenish-black; with subacetate of lead, light gray; with sulphate of copper, light green; and when evaporated to dry-

ness, left a brown residue of a slightly bitter and astringent taste. The precipitate containing sulphide of lead was then treated with hot alcohol; the resulting solution was of a dark brown color, and gave the following results, alcohol having been previously added to the test solutions: Solution of mercury bichloride first becomes clear by oxidation, then, if more be added, a grayish-white precipitate is produced; chloride of iron, greenish-black; caustic potash, clear, then a brown precipitate; caustic soda, dark brown; subacetate of lead, brownish-gray.

Ethereal Percolate.—Three ounces of the bark were exhausted with ether, the resulting percolate being of a dark green color, which gave a decided precipitate with solution of gelatin; was then detannated with oxide of lead, evaporated to dryness, and the bitter principle taken up with stronger alcohol, which leaves, on evaporating, a light yellowish-green mass, of a neutral reaction, and of a purely bitter taste, slightly soluble in water and freely so in alcohol; this corresponds in all respects to the viburnin obtained by Krämer from Viburnum opulus. The bark, after treating with ether, was then percolated with water; this percolate was found to have an acid reaction; it was then rendered alkaline by lime water, when a dark precipitate was obtained; this was filtered and tested for tartaric acid, but none was found. Then a portion of the precipitate was washed with dilute solution of hydrochloric acid, which, on being neutralized with ammonia, and acetic acid added, gave a precipitate of oxalic acid, also with solution of acetate of soda.

The filtrate obtained from lime water precipitation was boiled; when another precipitate was obtained this was filtered out, the precipitate washed with diluted acetic acid; this, when ammonia was added, remained clear, but on boiling a precipitate of citric acid was obtained. To the clear filtrate obtained, on boiling, an equal bulk of alcohol was added, when a precipitate of malate of calcium was obtained; this was washed on a filter with alcohol to remove coloring matter, then with boiling water to dissolve the malate. Acetate of lead added to this solution precipitated malate of lead, and when heated first agglutinated, then fused.

Valerianic Acid.—A decoction of a half pound of bark was then percolated with hot water; this percolate has an acid reaction, and on being distilled with sulphuric acid the distillate is slightly colored, has an odor of old apples and an acid reaction; this was neutralized with the officinal solution of caustic soda, sp. gr. 1·071, evaporated to dry-

ness, dissolved in water and again distilled with sulphuric acid; the distillate was slightly colored, and had the distinct odor of valerianic acid; this was neutralized with caustic soda and evaporated to dryness. A portion of the resulting valerianate of soda was dissolved in amylic alcohol, sulphuric acid added, and heated, when the characteristic apple odor was developed. An aqueous solution of valerianate of soda and of sulphate of zinc were heated separately and then mixed, when, on cooling, crystals of valerianate of zinc separated in white pearly crystalline masses; these are soluble in alcohol, and in a large quantity of water, and have a styptic taste and an acid reaction, turbid when heated, clear on cooling, and are soluble in ammonia water.

Analysis of Ash.—Twenty grams of the bark, in powder, were carefully dried and weighed; total weight, 18·6 grams; on incinerating, it was found to weigh 1·65 gram; on percolating with water and drying, it weighed 1·579 gram. The aqueous percolate gave a dense white precipitate with solution of chloride of barium, insoluble in boiling nitric acid, and on addition of water the precipitate is not dissolved, showing the presence of sulphuric acid. With solution of nitrate of silver a curdy white precipitate of chloride of silver was obtained, soluble in ammonia, insoluble in boiling nitric acid; on addition of perchloride of platinum to the original solution a precipitate of potassium was obtained.

The ash was percolated with dilute solution of hydrochloric acid, which caused it to effervesce, showing the presence of carbonates; the ash was nearly all dissolved, only a slight portion remaining on the filter. The filtrate gave a copious precipitate with ferrocyanide of potassium, showing the presence of the ferric salts of iron. When ammonia was added to the filtrate it became cloudy, and clear again on addition of acetic acid. Ammonia was added to the filtrate to precipitate the iron, filtered, and to the filtrate solution of chloride and carbonate of ammonia, boiled and filtered, when a precipitate was formed. This was filtered, washed and dissolved in acetic acid; this gave no reaction with chromate of potassium, showing the absence of barium; but with oxalate of ammonia a white precipitate of calcium oxalate was formed. The filtrate gave a copious precipitate with phosphate of ammonia, showing the presence of magnesium. The small residue of ash remaining undissolved in hydrochloric acid solution under the blow-pipe only gave evidence of iron.

Chemical Constituents.—1, a brown resinous body, of a very bitter

taste, from which it was found impossible to separate the sugar; 2, a greenish-yellow resin or neutral body, of a bitter taste, slightly soluble in water, freely so in alcohol, called by Krämer viburnin; 3, a volatile acid answering to all the tests of valerianic acid; 4, a tannic acid, giving greenish-black color with ferric salts; 5, oxalic acid; 6, citric acid; 7, malic acid; 8, sulphates, and, 9, chlorides of calcium, magnesium, potassium and iron.

EUGENIC ACID.

By L. C. Pettit.

Extract from an Inaugural Essay.

The following experiments were made with the volatile oils of cloves, pimento and bay, with reference to the amount of eugenic acid contained in each of them:

A strong solution of caustic potassa was added to the oil of cloves, which occasioned a yellowish-white precipitate; to prevent the mixture becoming solid small quantities of water were added, and the potassa solution was added as long as it produced any perceptible effect.

When an excess of potassa had been added the liquid assumed a deep red color, and lost the peculiar odor of oil of cloves.

The mixture was transferred to a glass retort connected with a Liebig condenser, but the excessive bumping prevented distillation. After adding to a portion of the liquid a number of fragments of glass and placing the retort on a sand-bath the distillation was proceeded with until the residue was nearly destitute of odor; sulphuric acid was then added to the mixture, which set free the eugenic acid, as a light-colored oily liquid, that changed to brown in a short time.

Diluted sulphuric acid was added to the solution of eugenate of potassium to effect decomposition, and then the whole was submitted to distillation. By this means a milk-like mixture of eugenic acid and water was obtained, that became clear after standing for several days, the eugenic acid falling to the bottom of the receiver as a clear, colorless oily liquid, which remained unchanged while it was protected by the water.

When the acid was withdrawn and placed over strong sulphuric acid under a glass receiver it assumed a deep ruby-red color, and the sulphuric acid changed to a brown.

A portion of the first formed solution of eugenate of potassium was heated to drive off the light oil of cloves, and sufficient sulphuric acid was added to neutralize the potassa, alcohol added and the sulphate of potassium removed.

This alcoholic solution of eugenic acid was digested with animal charcoal at a high temperature for half an hour without decolorizing it.

One-half of this solution was set aside to crystallize, the other treated with diluted sulphuric acid.

The crude eugenic acid was washed with cold water and rectified by distillation from a small flask by the heat of a sand-bath.

The eugenic acid came over at 416°F. (213°C.) as a clear, colorless oily liquid, with an empyreumatic odor; a black charred mass was left in the flask, which dissolved in liquor potassa and was wholly volatilized by heating on platinum foil; after standing, the rectified acid assumed an odor resembling oil of cloves, had a hot burning taste and became colored on standing.

The amount of crude acid obtained from 15·5 grams of oil of cloves in the above-mentioned manner was 12·6 grams, which rectifying reduced to 11·2 grams, or about 72 per cent.

The solution of eugenate of potassium which had been set aside to crystallize yielded a solid mass of feathery white crystals, which were washed with benzin to remove the mother liquor, drained and dried on filtering paper at a low temperature.

One decigram of the eugenate of potassium was well shaken with 10 grams of benzin, the liquid decanted, the residue carefully dried, and the loss was found to be ·01 gram. This shows that it requires 1,000 parts of benzin to dissolve one of eugenate of potassium.

It is soluble in alcohol and glycerin, and is decomposed by water; has a strong odor of cloves, and a hot, acrid taste; with liquorice root and tragacanth it can be readily made into pills.

Oil of pimento was treated in a manner similar to that detailed for the oil of cloves, and the results were somewhat similar, the liquid, however, becoming a deep red color; the residue was treated as in the first detailed experiments, with similar results, the acid having an odor like that obtained from oil of cloves, and the residuum in the flask being similar.

Fifteen and a half grams of oil of pimento gave 11·1 grams of crude acid, and upon rectification 9·5 grams were left; this gives 61 per cent.

A fresh portion of oil was treated with an excess of strong potassa solution, diluted, permitted to stand for a time in a test tube, and the light oil rising to the surface was separated; if an excess of water was added the eugenate of potassium would be decomposed.

To a small portion of the light oil, after it was carefully dried, bright pieces of metallic sodium were added; these produced no immediate effect, the sodium remaining bright; but after twenty-four hours the light oil became a brownish-red, the sodium still remaining brilliant; when oil of pimento is thus treated with sodium a rise of temperature ensues, effervescence takes place, and a solid mass results.

When oil of bay was treated in a similar manner a yellowish-white precipitate was formed, which dissolved in an excess of the potassa solution; the light oil separated without distillation.

When 15·5 grams of the oil of bay were treated like oil of cloves and oil of pimento 7·5 grams of eugenic acid were obtained, which when rectified left 6·4 grams; this shows 41 per cent.

Treated with metallic sodium, the light oil from oil of bay when dried was not affected; upon standing, it became red-brown.

The oil of bay when treated with metallic sodium effervesces, rises in temperature and becomes a crystalline mass; strong nitric acid reacts violently with it, but does not take fire, becoming at length of a deep brown red color; strong sulphuric acid turns it brown-red without effervescence, and does not acquire the purple color that oil of cloves does.

The eugenic acid from oil of bay gave a crimson-red color with sulphuric acid; sulphuric acid and bichromate of potassium turned green, which gradually deepened on standing; strong nitric acid gave a deep brown red liquid and a resinous mass.

The reactions with oil of cloves and strong sulphuric acid, first a red and finally a deep purple color; with oil of pimento, a deep crimson-red color.

Eugenic acid from oil of cloves, first a red color, changing to a purple not so deep as that from the oil.

Eugenic acid from oil of pimento, same red color, changing to purple.

Oil of cloves when treated with sulphuric acid and bichromate of potassium first yields a dark green color, which deepens on standing; the oil of pimento and eugenic acid from each of the oils first gives a light green, which deepens upon standing; in each of the oils the

green color was accompanied with a light brown layer around the edges of the liquid.

The reaction of the oil of pimento and acid from it with iodine gave rise to a red-brown color that became very dark on standing twenty-four hours; oil of cloves and the acid from it when treated in like manner gave similar coloration, but not so deep; when treated with mercuric chloride the oil of cloves and its acid at a gentle heat gave a deep purple color; the oil of pimento under similar treatment gave less color.

Strong nitric acid produced a violent reaction with each of the oils, but did not inflame. The color by oil of pimento was a light red-brown, that by oil of cloves darker.

The eugenic acid prepared from each gave effervescence and deep red-brown color, and on standing for twenty-four hours with nitric acid, both oils and acid gave crystalline deposits, greater in amount from the oil of cloves than from the other. The crystals were very soluble in water, yielding precipitates with chloride of calcium soluble in hydrochloric but insoluble in acetic acid; solution of permanganate of potassium with sulphuric acid turns light brown with oil of pimento, and this becomes darker on further additions of the reagent; oil of cloves gives similar reactions, but more decided. The eugenic acid derived from both oils gives crimson-red color; both oils and acids decolorize the solution and give brown precipitates.

The specific gravity of eugenic acid was found by experiment to be 1·0785; this applies to acid obtained from oil of pimento.

Throughout these experiments the acid prepared from the oils gave similar reactions under the same treatment, and their physical properties were alike; the odors of oils of pimento and bay seemed to be due to their hydrocarbons, but the odor of that from oil of cloves does not have the characteristic odor of the oil. Eugenic acid can be obtained more economically from oil of cloves, but with less trouble from oil of pimento.

When applied to the skin it produces a burning sensation. Chlorine gas when passed into it produces a greenish-white turbidity, increasing as more gas is passed through it. Hydrochloric acid produces the same color, but is not increased in intensity. It is insoluble in glycerin.

After drying over concentrated sulphuric acid, at a low temperature, small crystals were seen floating on the top of the eugenic acid; strong

hydrochloric acid while cold produces no effect; but on heating, it deflagrates violently; aqua regia turns it a deep brown-red color, and finally chars it.

The composition of the acid was determined by Bonastre and Dumas to be

C_{10}	H_{12}	O_2 =
73·18	7·13	19·51

The medicinal properties and compounds are but little known.

CHARACTERISTIC TESTS OF BEESWAX—VEGETABLE AND ARTIFICAL.

By H. Hager.

Translated and condensed from "Pharm. Centralh.," April 8, 1880, p. 119–121, by Louis von Coltzhausen, Ph.G.

The analysis makes the following processes necessary:

1. *Determining the specific gravity.* In case the mass does not contain moisture cut off five or more small pieces or melt a few grams in an evaporating dish supplied with a lip, drop the wax on a pane of glass which has previously been wiped off with a moist cloth, and place the glass into cold water. The drops will either readily drop off at the slightest touch, or are removed at the expiration of half an hour with a knife. The specific gravity is then determined as usual by the floating test, which consists in mixing alcohol and water in such a proportion that the wax-drops will float in the mixture without showing a tendency to rise or sink. The drops containing air-bubbles can be readily recognized and are rejected. The specific gravity of pure yellow or white wax lies between 0·956 and 0·964, usually between 0·958 to 0·960. If, therefore, the specific gravity of the suspected wax is not between 0·956 to 0·964 it is very probably adulterated. Wax containing an admixture of stearic acid, resin or Japan vegetable-wax has usually a higher, and wax adulterated with tallow, paraffin or ceresin, a lower specific gravity.

2. *Dissolving in hot chloroform or in a fatty oil.* The solution of dry beeswax is clear, but slightly cloudy in case the wax was moist, but ought not to contain any sediment, which, if present, ought to be collected and determined (mineral substances, starch, etc.).

3. *Borax test.* 6 to 8 cc. cold saturated borax solution are heated in a test tube with a piece of the suspected wax as large as a bean,

until it melts, when the mixture is shaken gently. The aqueous liquid becomes slightly cloudy if the wax is pure beeswax, but never becomes milky. When set aside for cooling the layer of wax collects on the surface of the liquid, leaving the latter almost clear, or only slightly turbid or half translucent. If it becomes milky immediately and remains translucent and milky even after cooling, either Japan vegetable wax or stearin are present. Resin and Brazil vegetable wax act like pure beeswax in this test.

4. *Soda test.* Mix in a test tube a piece of wax, the size of a bean, and 6 to 7 cc. sodium carbonate solution (1 salt, 6 water). Heat in such a manner that the upper layer of the liquid is heated without agitation until the wax is melted. If much froth is noticed at the wax layer stearic acid is probably present. The whole is then heated to the boiling point. If the liquid becomes milky, milky-yellowish or milky white, Japan wax or stearic acid is present. In this case the aqueous liquid remains milky, even after cooling; in case Japan wax is present, more or less pasty, or even stiff, while if stearic acid is present the milky layer is usually liquid, and often appears crossed by clear layers. The wax layer on the surface is usually brittle and not hard.

Pure beeswax appears hard after cooling slowly, and the aqueous layer is cloudy, but not milky, frequently semi-translucent and entirely liquid.

If the beeswax contains pine resin this test will cause an entire separation of the resin. Instead of merely heating to the boiling point allow to boil for one minute and then to cool gradually. The mass then consists of three layers, an upper hard wax layer, a liquid slightly turbid middle aqueous layer, and a loose or flocculent resin layer on the bottom. The resin can then, of course, be readily determined quantitatively.

A FEW SPECIES OF RHUBARB.

By H. v. Schlagintweit.

Translated and condensed from "Ztschr. d. Allg. Oest. Apoth.," Ver., April 10, 1880, p. 170, by Louis von Cotzhausen, Ph.G.

The cultivation of rhubarb in India was hitherto unsuccessful. The so-called "India rhubarb" of commerce consists of roots cultivated in the neighboring districts of High Asia. There is as little of this in

the market as of the Persian product, while the so-called "Turkey rhubarb" is supplied by the Chinese, and is considered the best root. The exact species which yield the rhubarb of commerce do not seem to be known so far. The following species were noticed by the author on the side of the Himalaya towards India and in Tibet:

1. *Rheum emodi*, Wallich, a large plant, having a thick stem, growing from Bhutan and Sikkim to Kaschmia on the India side of the Himalaya, frequently reaching a height of more than six feet, and also indigenous to Western Tibet, but less abundant. In most districts of north-eastern and central dry High Asia its efficacy is greatly praised, while in the damp and warm districts of Sikkim and Bhutan the root seems to be inefficacious. The whole sour stems are eaten both stewed and raw, while the leaves are dried and smoked in Tibet and in the Eastern Himalaya.

2. *Rheum leucorrhizum*, Poll. (*Rh. tartaricum*, L.) During the period of infloresence it is usually two inches (Engl.) high, then gradually grows to a height of one foot. It grows plentifully in the dry districts. The root is said to be very efficacious, and the leaves are also smoked. The following species were met with less frequently:

3. *Rheum webbianum*, Royle, is indigenous to the vicinity of Simla at an elevation of more than 12,000 feet, and is also found in Kumáou, principally in the passes over the Niti Ghat towards Gnári Khórsum.

4. *Rheum moorcroftianum*, Royle, is indigenous to Kumáou and Gurhvál at an elevation of 12,000 feet; this species has very small stems.

5. *Rheum spiciforme*, Royle. The root of this species is lighter and harder than usual, while the leaves are thick and tough. It is indigenous to Northwestern Tibet.

NOTE ON SOME "SPURIOUS GUMS" IMPORTED WITH MYRRH.[1]

By R. H. Parker.

Last year I had the opportunity of selecting from several bales of unpicked myrrh a considerable quantity of numerous kinds of "spurious gums," to which I briefly referred in a paper[2] previously read before this Association, and I propose submitting to you as a sequel to that paper

[1] Read before the School of Pharmacy Students' Association, July 8, 1880.

[2] "Pharm. Journ.," [3], x., p. 81.

the results of a somewhat more detailed examination of the impurities there referred to.

It will, of course, be understood that these substances rarely find their way into the best parcels of "picked Turkey myrrh," being carefully rejected by the wholesale houses.

Five substances will be referred to, those met with in largest quantity, viz.:

1. Opaque bdellium.
2. African bdellium.
3. Opaque tasteless gum-resin.
4. Yellow tasteless gum-resin.
5. Bitter acrid gum.

The percentage composition of these impurities as given in this note is based upon the solubility of the substance in absolute alcohol and water, and will serve to give an idea of their constitution, but the results do not, of course, indicate the exact proximate constituents.

The general outline of the analysis is as follows:

Several of the largest and most characteristic of the tears were selected, the outer portions removed, so as to leave the "gum" quite free from extraneous impurity and, if sufficiently hard, reduced to a fine powder, otherwise, as in the case of "bitter acrid gum," cut into thin shavings with a knife.

Determination of Moisture and Ash.—About 1 gram of the powder, accurately weighed in a platinum dish, was exposed in a hot-air bath at 100°C. for several hours until it ceased to lose weight. The loss of weight = moisture. A little volatile oil might be dissipated in this process, but it is probable that a dry heat of 100°C. would not cause much error from that cause. The dry residue was then ignited until all traces of carbon were removed. The weight of dish and ash less that of dish (weighed after ignition) indicates "the ash." The "ash" is not included as a separate item in the percentage composition, because all extraneous matter had been removed; it would, therefore, have been in a state of combination with the gum, and would be included in the weight of that constituent.

Determination of Gum.—2 or 3 grams of the powder were digested with successive portions of absolute alcohol and the tincture decanted; when the soluble portion was nearly all removed, the residue was collected in a weighed filter, washed till the evaporated filtrate left no

residue, dried at 90°C. till constant and its weight taken; from this is calculated total percentage of gum.

An accurately weighed portion of the dried gum was treated with water until nothing further dissolved, the residue collected in a tared filter, dried at 100°C. and weighed. This weight, less that of filter, gives weight of gum insoluble in water; this deducted from that of total gum gives by difference gum soluble in water.

Determination of Resin, etc.—The weight of this is taken "by difference," and includes resins, volatile oil, if any, and other substances soluble in absolute alcohol.

1. *Opaque Bdellium* (*Balsamodendron Playfairii*) is a very hard, yellow ochre-colored, opaque gum-resin, with but slight odor and a bitter taste. In common with other exudations from the genera *Balsamodendron* and *Boswellia*, tears of this substance frequently have portions of papery bark attached to their surface. Triturated with water, opaque bdellium forms a very good cream-colored emulsion. Cold absolute alcohol dissolves about 50 per cent.; the residue is not entirely soluble in water, the insoluble portion swelling up and giving the characters of bassorin.

The coloring matter appears to be due to a resin very soluble in alcohol, giving a canary yellow colored tincture; this resin is also soluble in ether, benzol and chloroform. The tincture (1 of gum-resin to 6 of rectified spirit) becomes slightly milky with alcoholic solution of plumbic acetate, gives a slight yellow precipitate with one drop of liq. plumbi subacet., and an intense greenish-black color with tinct. ferri perchlor.[1] The tincture is bitter and becomes milky with water.

The mucilage made by dissolving 1 part of the gum (completely washed with rectified spirit) in 40 of water is tasteless, partly precipitated by subacetate of lead and not at all by neutral acetate.

The ash (1·6 per cent.) appears to be chiefly calcic carbonate, dissolving entirely with effervescence in dilute acetic acid and giving a copious precipitate with ammonium oxalate.

Water distilled from opaque bdellium had the slight odor of the drug, but there was no appearance of oil globules in working on a small scale.

[1] Ferric chloride does not give this reaction with a tincture of "gum hodthai" or "gum hotai," a substance which has been referred to the same botanical source as opaque bdellium.

Composition of opaque bdellium:

Soluble in alcohol (by difference),	47·42
Gum soluble in water,	30·01
Gum insoluble in water,	11·07
Moisture,	11·50
	100·00

2. *African Bdellium* (*Balsamodendron Africanum*) is a gum-resin, the fracture of which is of a dull slaty hue, the margins possessing a powdery resinous appearance; it is hard, translucent in thin layers, red by transmitted light, has a bitter taste and its slight aromatic odor recalls that of black pepper. Triturated with water it does not form an emulsion, but on standing gives a nearly bright mucilage with a copious brown sediment. The mucilage is very thick unless a large quantity be added, indicating presence of a considerable proportion of gum allied with tragacanth.

The tincture of African bdellium is very light yellow; almost the whole of the brown coloring matter is insoluble in alcohol, chloroform, ether and turpentine. Alcohol extracts about 15 per cent.; one-half of the residue, including the coloring matter, is insoluble in water, simply swelling up like tragacanth, but dissolves to a brown solution with a little caustic potash.

The tincture (1 to 6) gives no precipitate with bromine, plumbic acetate, nor with ferric chloride; a drop of liq. plumbi subacet. produces a slight precipitate, and water renders it milky.

The mucilage (made by treating with water the residue insoluble in alcohol) is tasteless, and gives a slight precipitate with subacetate but none with neutral acetate of lead.

The estimation of moisture and ash gave 13·6 per cent. of the former and 1·16 per cent. of the latter, consisting chiefly of calcic carbonate.

Distilled with water, African bdellium gave indication of the presence of a considerable quantity of volatile oil possessing the characteristic odor of the drug; the first portion which came over was nearly colorless, the latter portion rather deep yellow, both lighter than water. The small quantity operated on did not admit of an exact percentage calculation.

Composition of African bdellium:

Soluble in alcohol (by difference),	15·4
Gum soluble in water,	33·2
Gum insoluble in water,	37·8
Moisture,	13 6
	100·0

Recorded analyses of African bdellium differ widely. Guibourt, in his fourth edition of "Drogues Simples," gives—

Resin,	59·0
Soluble gum,	9·2
Bassorin,	30·6
Volatile oil and loss,	1·2
	100·0

while Planchon, in the seventh edition of the same work, says it yields 70·3 per cent. to boiling alcohol, the rest being a *gum completely soluble in water*.

3. *Opaque tasteless gum-resin* occurs in large tears with smooth surface, is very hard, has a dull waxy fracture and is almost devoid of color, odor and taste. Several pieces have papery bark attached, and two or three large tears were found imbedded in fine specimens of myrrh, suggesting their exudation from the same trunk under abnormal conditions, but the gum and resin differ materially from those of myrrh.

Triturated with water this substance gives a very slightly milky solution and a copious sediment. It is soft and adhesive between the teeth.

Alcohol dissolves about 60 per cent.; the residue is almost entirely soluble in water.

In the air-bath a portion lost 7·6 per cent. at 100°C., and when ignited left ·865 per cent. of ash, chiefly calcic carbonate.

The tincture (1 in 6) is not precipitated by bromine or plumbic acetate, or changed by ferric chloride or lead subacetate; it becomes milky with water.

The mucilage is not affected by neutral acetate of lead and only slightly precipitated by subacetate.

Composition of opaque tasteless gum-resin:

Soluble in alcohol (by difference),	60·54
Gum soluble in water	30·32
Gum insoluble in water,	1·54
Moisture,	7·60
	100·00

4. *Yellow Tasteless Gum-Resin.*—This is at once recognized by the peculiar powdery yellow appearance of the surface of the tears, which are mostly small and irregular. It is yellowish-white in color, almost devoid of taste and odor, hard and easily powdered; resinous when

chewed. It does not emulsify when triturated with water, the liquid becoming quite clear after deposition of much sediment.

Alcohol dissolves about 63 per cent.; the residue is almost entirely soluble in water.

A portion lost 3·62 per cent. at 100°C., and on ignition left a residue, mostly calcic carbonate, equal to ·48 per cent.

The tincture (1 in 6) is not changed by either lead solution, bromine solution, or by ferric chloride.

The mucilage gives a slight precipitate with subacetate, but none with neutral acetate of lead.

Composition of yellow tasteless gum-resin:

Soluble in alcohol (by difference),	63·16
Gum soluble in water,	31·76
Gum insoluble in water,	1·46
Moisture,	3·62
	100·00

Chemically and constitutionally this appears almost identical with opaque tasteless gum-resin, but it differs physically in its gritty character when chewed, and in the powdery yellow and irregular surface of the tears.

5. *Bitter Acrid Gum.*—This appears to be one of the several substances that have received the native designation "googul," and seems identical with the specimen 139*l* in the Pharmaceutical Society's museum, but differs from the "googul" 139*j*. It occurs in very irregular tears of a yellowish-brown, or dark-brown color, sometimes very nearly colorless and transparent. Its taste is very bitter and persistently acrid, somewhat resembling ammoniacum. It is soft, receiving the impress of the nail, and a small piece can be kneaded between the fingers.

It readily forms when triturated with a small quantity of water a thick opaque mucilage, and, with the exception of a trifling residue, is entirely soluble in about 25 parts of water. This residue examined microscopically was seen to consist entirely of vegetable tissue, chiefly long fusiform prosenchymatous cells, with a few fragments of pitted vessels.

A portion lost at 100°C. 6·6 per cent., and left on ignition an ash of calcic carbonate equal to 1·11 per cent.

Cold absolute alcohol dissolves about 63 per cent.

The tincture (1 in 6) contains the bitter acrid principle, and is not

rendered milky by addition of water; gives a very copious precipitate with subacetate of lead, becomes milky with neutral acetate, and gives a slight whitish precipitate with ferric chloride, but none with bromine solution.

The gum insoluble in alcohol forms with water a tasteless mucilage, which gives a copious precipitate with subacetate, but very little with neutral acetate.

On treating this substance with about six parts of water, the coloring matter and gum precipitated by subacetate of lead dissolve, the remainder forming a thick oily layer at the bottom of the vessel; this layer again treated with three or four parts of water becomes of a very light yellow color and dissolves entirely in more water, giving a nearly colorless solution which is scarcely precipitated by subacetate of lead, and possesses in a marked degree the characteristic bitterness and acridity of the original substance. Distilled with water a very small quantity of oil came over slowly, floating on the distillate, which possessed the odor but not the taste of the gum.

Composition of bitter acrid gum:

Soluble in alcohol (by difference),	63·0
Gum insoluble in alcohol,	30·4
Moisture,	6·6
	100·0

The alcoholic solution appears to contain the bitter acrid principle, essential oil and a substance precipitated by subacetate of lead, for the oily layer separating from the aqueous solution washed and dissolved in water gives scarcely any precipitate with subacetate, and the subsequent addition of alcohol causes no separation.

Bissa bôl was almost entirely absent from the bales of myrrh examined; so also was Indian bdellium, unless the yellow tasteless gum-resin be that substance; it differs, however, materially from the specimen of Indian bdellium in the Society's museum.

A considerable quantity of transparent gum was found which appears to resemble inferior acacia gum; also several tears resembling externally the yellow tasteless gum-resin, some having an oily interior and an aromatic terebinthinate odor, while one tear, when broken, possessed an odor strongly resembling jargonelle pear.—*Pharm. and Trans.*, July 17, 1880.

chewed. It does not emulsify when triturated with water, the liquid becoming quite clear after deposition of much sediment.

Alcohol dissolves about 63 per cent.; the residue is almost entirely soluble in water.

A portion lost 3·62 per cent. at 100°C., and on ignition left a residue, mostly calcic carbonate, equal to ·48 per cent.

The tincture (1 in 6) is not changed by either lead solution, bromine solution, or by ferric chloride.

The mucilage gives a slight precipitate with subacetate, but none with neutral acetate of lead.

Composition of yellow tasteless gum-resin:

Soluble in alcohol (by difference),	63·16
Gum soluble in water,	31·76
Gum insoluble in water,	1·46
Moisture,	3·62
	100·00

Chemically and constitutionally this appears almost identical with opaque tasteless gum-resin, but it differs physically in its gritty character when chewed, and in the powdery yellow and irregular surface of the tears.

5. *Bitter Acrid Gum.*—This appears to be one of the several substances that have received the native designation "googul," and seems identical with the specimen 139*l* in the Pharmaceutical Society's museum, but differs from the "googul" 139*j*. It occurs in very irregular tears of a yellowish-brown, or dark-brown color, sometimes very nearly colorless and transparent. Its taste is very bitter and persistently acrid, somewhat resembling ammoniacum. It is soft, receiving the impress of the nail, and a small piece can be kneaded between the fingers.

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Composition of bitter acrid gum:

Soluble in alcohol (by difference),	63·0
Gum insoluble in alcohol,	30·4
Moisture,	6·6
	100·0

The alcoholic solution appears to contain the bitter acrid principle, essential oil and a substance precipitated by subacetate of lead, for the oily layer separating from the aqueous solution washed and dissolved in water gives scarcely any precipitate with subacetate, and the subsequent addition of alcohol causes no separation.

Bissa bôl was almost entirely absent from the bales of myrrh examined; so also was Indian bdellium, unless the yellow tasteless gum-resin be that substance; it differs, however, materially from the specimen of Indian bdellium in the Society's museum.

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In the July number of this journal, page 356, we published a very interesting paper upon the histology of the Japanese belladonna. The following paper upon the chemical constitutents most admirably supplements the former.

THE CONSTITUENTS OF JAPANESE BELLADONNA (Scopolia japonica).

Scopolia japonica, which is called by the Japanese rôtô, or onishirikusa, or omisikusa, or omekikusa, or hashiridokoro (which last term is the most usual one), is a member of the natural family Solanaceæ, and is highly poisonous. Its root has been employed for a very long time by Japanese physicians, and there can be no doubt that it possesses valuable therapeutic properties.

The latter reside in two alkaloids, which were obtained in the following manner: The dried root was powdered and several times extracted with alcohol, the alcohol was distilled off from the united tinctures, the residue dissolved in water and filtered to remove the separated fat. The clear filtrate was now precipitated with solution of acetate of lead, the precipitate removed by filtration, the filtrate freed from excess of lead by sulphuretted hydrogen, and after again filtering the solution concentrated, at a moderate heat, on a water-bath. The thin liquid residue was mixed with sulphuric acid, the mixture shaken with chloroform and the chloroformic solution separated. On evaporation the latter left behind slender colorless needles, which were contaminated with a yellow, smeary mass. The whole residue was boiled with water, the liquid, after cooling, was filtered, the filtrate concentrated on the water-bath at a low temperature and cautiously mixed with ammonia. This produced a white precipitate, which was collected on a filter, washed with a little water and then dissolved in alcohol, which, on evaporation, left behind colorless crystals. These had the characteristics of an alkaloid. Owing to the minute proportion in which this alkaloid exists in the root, the quantity obtained was insufficient for an accurate investigation of its properties and nature. A few drops of the aqueous solution of the sulphate of this alkaloid dropped into the eye of a rabbit produced dilatation of the pupil. I propose to name this alkaloid rotoine (from the Japanese name rôtô), and reserve to myself its further study.

The second alkaloid, which I term scopoleine, exists in the root in larger proportion. It is obtained by adding an excess of soda solution

to the acid liquid left after shaking with chloroform and by again shaking the now alkaline liquid with chloroform. The latter takes up the alkaloid and deposits it, on evaporation, in an impure condition, as a yellowish-brown, resinous mass. In order to purify it, it was dissolved in dilute sulphuric acid and the solution carefully mixed with sodium carbonate, as long as the precipitate was dirty and slimy. After filtering, a further quantity of sodium carbonate was added as long as a precipitate was formed. The latter was collected on a filter, washed and dissolved in chloroform. On evaporating the latter, the alkaloid was obtained as a yellowish, resinous mass, which, when perfectly dry, may be rubbed up to a yellowish-grey powder, possessing a great tendency to run together. I have been unable to obtain this alkaloid in a crystalline condition or to form crystallized salts. It is difficultly soluble in water, easily in acidulated water, also easily in chloroform and alcohol. All these solutions, except when supersaturated with acid, have a strong alkaline reaction. It yields precipitates with nearly all alkaloidal reagents.

Regarding its effect on the animal organism, I can at present (July 22, 1878, at a meeting held in Tenkion, Yedo, Japan—ED. N. R.) only say that it seems to act similarly to atropia. What relation it bears to the latter, however, I am not at present prepared to say, but hope to be soon able to give a fuller account of its composition, products of decomposition and physiological effects.—Dr. A. Langgaard, from "Mittheilungen der Deutschen Gesellschft für Natur- und Völkerkunde Ost-Asiens," fol. Yokohama. No. 16 (December, 1878), p. 267.

Note by ED. N. R.—A short account of the root of *Scopolia japonica* and its uses, by Dr. G. Martin, of Tokio, Japan, may be found in the "Archiv der Pharmacie," December, 1878, p. 336. Dr. Martin states that it is called Japanese belladonna, but that its narcotic effects are much less marked than those of true belladonna. He says it contains solanine, but no atropine. The plant is further remarkable from the fact that it communicates to liquids a stronger fluorescence than any other known plant.—*Pharm. Journ. and Trans.*, July 3, 1880, from *New Remedies*, June, 1880.

QUINIC ACID, QUINONE AND THEIR DERIVATIVES.[1]

By O. Hesse.

Quinic Acid.—The quinic acid employed in this investigation was chemically pure, and was prepared from the calcium salt by decomposition with oxalic acid, according to the method which has been previously described by the author. By evaporation of an aqueous solution of quinic acid, the greater part of the acid quickly separates in a crystalline form, but the mother liquor still contains amorphous quinic acid, and the author states that the presence of a very small quantity of a foreign substance is sufficient to hinder the crystallization. The amorphous acid can easily be converted into the crystalline form by purifying its calcium salt with animal charcoal, then proceeding as before described. Quinic acid contains no water of crystallization, and the author draws attention to this fact because from a misconception of his earlier statement on the subject Graebe has assumed the formula of quinic acid to be $C_7H_{12}O_6 + H_2O$.

Tetracetyl quinide, $C_7H_6(C_2H_3O)_4O_5$ m. p. 124° (uncorr.), is obtained as an amorphous mass which becomes vitreous on cooling by the action of acetic anhydride on quinic acid in a sealed tube at 170°. It is purified by melting it repeatedly in hot water and finally washing it with cold water. On being dried in the air it is obtained as a white powder, which is insoluble in cold water and soluble with difficulty in hot water. It melts in boiling water and is gradually decomposed by longer heating its aqueous solution, which then becomes acid. Its aqueous or alcoholic solution becomes turbid on being cooled, and the anhydride separates in granular crystals. The formula as above assigned to this body was confirmed by it yielding the anhydride (quinide) $C_7H_{10}O_5$ when boiled with magnesia, and quinic acid when decomposed with lime, the author having previously shown that quinide is converted by the action of lime into quinic acid.

Action of Bromine on Quinic Acid.—By the action of bromine on an aqueous solution of quinic acid an acid is obtained which the author had named carbohydroquinonic acid, on the supposition that it yielded hydroquinone when heated. But it was afterwards shown that the black precipitate which this decomposition product gave with ferric chloride was a pyrocatechin compound; hence the name of the acid was altered to carbopyrocatechuic acid. Strecker subsequently obtained

[1] Abstract of a paper in "Liebig's Annalen" [200], 232—255.

the same acid by fusing piperinic acid with caustic potash, and named it pyrocatechuic acid, and to him is improperly ascribed the discovery of this acid.

The author has repeated his former experiments, and this time on a large quantity of pyrocatechuic acid, which had been prepared as before by the action of bromine on quinic acid, and he now finds that hydroquinia is not produced, as he had previously assumed. When operating with a large quantity of pyrocatechuic acid the decomposition does not proceed very smoothly; a carbonaceous mass is formed whilst phenol and pyrocatechin distil over.

In addition to pyrocatechuic acid another acid is produced by the action of bromine on quinic acid. It can be obtained by evaporating the product of the reaction to a syrup, agitating it with ether, then treating the ether residue with lukewarm water in which the new acid is insoluble, but which dissolves the pyrocatechuic acid. It can be purified by recrystallization from boiling water. It crystallizes in colorless laminæ or in needles, which dissolve with some difficulty in boiling water and are almost insoluble in cold water, but easily dissolve in ether. It carbonizes when heated, giving pungent fumes and a brown colored distillate which solidifies to a radiated crystalline mass and, like the original substance, gives no coloration with ferric chloride. Its hot saturated solution gives no precipitate with lead acetate but a considerable quantity of a yellowish white precipitate with basic lead acetate. The composition of this substance has not yet been ascertained, but it is said to be a bromine derivative.

Action of Concentrated Hydrochloric Acid on Quinic Acid.—Warm concentrated hydrochloric acid quickly dissolves quinic acid, but without decomposition; but when heated with it at 140 to 150° in a sealed tube it is converted into hydroquinone and paraoxybenzoic acid.

Graebe obtained pyrocatechuic acid by the action of potassium hydrate on quinic acid, and the author states that a similar result ensues by using sodium hydrate, and that neither oxysalicylic acid nor hydroquinone carbonic acid is produced.

Quinone.—As an addendum to his former remarks on this substance the author states that it is somewhat readily soluble in boiling petroleum ether, but very readily so in boiling ligroin (*sic*), and as the greater part of the quinone recrystallizes out on cooling in beautiful yellow prisms, these solvents serve as a ready means of purifying this substance.

The author is unable to confirm the statement of Sarauw, that diace-

tylhydroquinone is formed by the action of acetic anhydride on quinone. He is of opinion that quinone is to be regarded as the aldehyd of quinone acid in this way :

Hydroquinone.	Quinone.	Quinonic Acid.
$C_6H_6O_2$	$C_6H_4O_2$	$C_6H_4O_4$
Alcohol.	Aldehyd.	Acid.

Hydroquinone.—In consequence of a statement by Hlasiwetz and Habermann ("Liebig's Annalen," 175, 62), with regard to the melting point of this body, the author has repeated his experiments and he now gives the melting point as 168 or 169° (uncorr.) instead of 172 or 173° (uncorr.). Hydroquinone is insoluble in boiling petroleum benzin, almost so in boiling chloroform, the chief part of it separating again from the latter on cooling. It forms no compound with phenol. Its concentrated aqueous solution gives a dark green or almost black precipitate of quinhydrone with ferric chloride or sulphate.

Quinhydrone is very easily soluble in slightly warm water, and this solution, unless disturbed, has a great tendency to remain saturated without crystallizing. Although in all cases the aqueous filtrate from the quinhydrone has a strong odor of quinone, yet it is impossible to obtain a complete conversion of hydroquinone to quinone by this method, nor even by heating the hydroquinone with ferric sulphate in a sealed tube at 80 to 100°. Quinone is, however, obtained in considerable quantity by the action of concentrated nitric acid on hydroquinone; by continuing the action of the nitric acid oxalic acid is produced.

Diacetylhydroquinone, m. p. 121° (uncorr.), is, contrary to the statements of other observers, an odorless and stable substance, even after long keeping.

Dinitrodiacetylhydroquinone, m. p. 94°, has been prepared and was of interest to the author, as he hoped that by the substitution of NH_2 for NO_2 in this compound a substance of the formula $C_{10}H_{12}N_2O_4$ would be obtained; in fact, a body which would stand in near relation to chitenin, $C_{19}H_{22}N_2O_4$, the dihydroxylquinia of Kerner. It was easily reduced by zinc and hydrochloric acid, yielding a base which, however, had no resemblance to chitenin or to any other alkaloid. In the free state this base was very unstable; its alcoholic solution gave a cherry-red color with ferric chloride.

Dipropionylichydroquinone, m. p. 113° (uncorr.), which crystallizes in colorless laminæ, and its mononitro-derivative, m. p. 86°, crystallizing

in pale yellow leafy crystals, have been obtained, and are described in detail.

Quinhydrone.—As is well known, this substance dissolves very easily in warm water, but it is partly decomposed thereby into quinone and hydroquinone, the solution acquiring the characteristic smell of quinone. It dissolves in hot glacial acetic acid apparently unaltered, and crystallizes out on cooling in greenish-black plates or prisms. It is insoluble in hot or cold petroleum ether and in ligroin. It is soluble with extreme difficulty in boiling chloroform, crystallizing out on cooling in small plates; but by this treatment the greater part of the quinhydrone is decomposed into quinone, which is carried away with the chloroform vapor, and into hydroquinone, which separates in colorless crystals. When heated it evolves bluish-violet fumes and gives a bluish-black sublimate.

The author does not agree with the structural formula assigned by Graebe or Wichelhaus to this body, but is of opinion that quinhydrone is to be regarded as a compound of one molecule of hydroquinone with one molecule of quinone, as by the action of acetic anhydride on it at 160 to 170° diacetylhydroquinone and quinone were obtained, the former approximating to the theoretical quantity. Phenoquinone, $C_{18}H_{16}O_4$, and methylquinhydrone, $C_{20}H_{20}O_6$, or $C_6H_4O_2.2C_6H_4(OHOCH_3)$, have been examined and the above formulæ assigned them by the author, who disputes the accuracy of the formulæ $C_{18}H_{14}O_4$ and $C_{20}H_{18}O_6$, as given them by Wichelhaus.

The Percentage of EXTRACTIVE SUBSTANCES soluble in ALCOHOL as a CRITERION of the PURITY of SPICES.[1]

By Max Biechele.

The author employs the following method: A flask of about 120 cc. contents is fitted with a cork, through one of the two holes in which passes the stem of a funnel of about 7 cm. diameter; through the other, a tube leading to the top of an upright Liebig's condenser. Five grams of the spice to be tested, previously dried at 30°C., are placed on a filter, which should not quite fill the funnel, covered with a disk of filter paper, and absolute alcohol poured through until the flask is half full. The funnel is then covered with an inverted funnel, the stem of which has been broken off, leaving an aperture, through which

[1] "Corr.-blatt d. Vereins analytischer Chemiker," 2, 70. Reprinted from the "Journ. of the Amer. Chem. Soc."

is passed the lower end of the condenser. The alcohol in the flask is then heated to boiling, and maintained at that temperature, until the prolonged percolation of the condensed alcohol through the spice has removed all soluble matters, and the filtrate is colorless. The filter, with its contents, is then partially dried at 100°C., the contents removed to a weighed porcelain dish, thoroughly dried at 100C., and again weighed. The volatile character of many of the extractive substances (essential oils, etc.) renders it impossible to estimate the residue from the evaporation of the alcohol. Proceeding by the foregoing method, the author has obtained the following percentages of extract from pure spices:

Cloves,	33·50
Cassia bark,	26·60
Cinnamon (Ceylon),	23·90
Caraway seed,	33·87
Fennel "	38·20
Black pepper,	19·87
Long "	37·00
White "	16·87
Red "	18·13
Coriander seed,	14·88
Star-anise,	25·68
Anise seed,	36·24
Clove pepper,	22·68
Mace,	37·60
Nutmegs,	32·70

PERSIAN OPIUM.

The following memorandum on the opium of Persia is taken from a report on the trade of the Persian Gulf by Consul-General Ross:

From the time the attention of the native merchants was attracted to the trade in this article, about twenty-five years ago, there has been, with two or three exceptions, a gradual annual increase in the production of the drug. But this increase has never before been so very considerable as to become prominently noticeable.

It was reported in 1859 that about 3,000 "shah mans," or 300 cases, of opium were produced in Persia; and in 1861 that about 10,000 "shah mans," or 1,000 cases, were expected to yield from the crops of the year a quantity which was then noticed to be double the outturn of the previous year.

In the trade report of this Residency for the year 1874–75, the fluctuations of the annual estimated produce of opium in Persia from the year 1868–69 to 1874–75 were shown in a tabular statement attached to a special report on the subject. The largest produce for any one year did not exceed 2,600 cases (a quantity inappreciably small in regard to the demands in China), and in 1874–75 it had fallen to some 2,000 cases. In the following year there was a further decline, the exports amounting to about 1,890 cases. Since 1876–77, however, a reaction appears to have taken place, as in that year 2,570 cases were exported from Bushire and Bunder Abbass alone.

In the early part of 1877–78 the probable yield of the crops was estimated at 3,500, but the actual number exported from Bushire and Bunder Abbass amounted to 4,730 cases.

Last year (1878–79) the out-turn was stated to have been 6,700 cases, while 5,900 were exported from these ports.

The probable yield of the crops of the current year, 1879–80, is at present estimated to be as follows:

	Shah Mans.	Cases.
In Khonsar, about	14,000	950
Kerman,	4,500	300
Yezd,	15,000	1,000
Ispahan,	37,000	2,400
Nereez,	6,000	400
Shiraz,	20,000	1,300
Kazran,	1,500	100
Shuster,	1,500	100
Total,	99,500	6,550

In addition to the above 6,550 cases of opium, about 3,000 "shah mans," or say 550 cases, are expected to come to Yezd from Herat, making the whole stock about 7,100 cases. The Shuster opium is sent through Mohammerah direct, and sometimes *viâ* Bushire to Mussat, for transmission to Zanzibar; but a part of it is supposed to be smuggled into the Indian frontier provinces *viâ* Mekran and Beloochistan. Thus, 7,000 cases are expected to be available during the current year for export through Bushire and Bunder Abbass to China and England.

Small quantities of opium are said to be grown in Tehran, Tabreez and Kermanshah, but these mostly find their way to Europe *viâ* Turkey, Smyrna being, it is alleged, the port where it is mainly taken to

and where it is mixed with the local drug and forwarded to the continental markets.

Opium is made up into cakes, varying in weight from ¾ lb. to 1½ lb., and in number from 96 to 192 or more; and these are packed in fig or vine leaves, and sometimes in poppy seeds or stalks, into cases containing each from 10½ to 11 "shah mans"—a "shah man" being equal to 13½ lbs. English.

The object in so packing in cases as regards the weight is that the contents, after the deficiency caused by drying up in course of transit, which is calculated at from 5 to 10 per cent., may realize at destination (China) one "picul," which is about 135 lbs. Another reason is that the weight is arranged for convenience of carriage by pack animals (generally mules) employed in these regions.

About five-sixths of the produce of opium in Persia is intended for China. The drug suitable for that market being required to be fine, and prepared with oil, and not rich in morphia, permits its being swelled up with foreign substance, and thus being, as far as practicable, adulterated to the extent to preclude discovery by the mode of testing or "touching" used in China.

It is said that pure and superior opium, though not so finely manipulated, has been rejected in China, while the fine opium, containing admixtures, has found favor and fair market.

The preparations made for the China marts—being, say of a quality of 80 "touch" (containing 80 per cent. pure juice and 20 per cent. foreign substance)—yield from 9 per cent. to 10 per cent. morphia.

The preparations for England, which have recently been specially made pure, and which have come into favor in Europe and America, have, it is said, yielded morphia averaging about 12 per cent.

The average price for fair quality of opium suited for the China market has been for the last two years about 950 rupees per chest, and for the special preparations for England about 100 rupees more.

To these are added the charges of transit and other contingent expenses from the place of product to the port of shipment, amounting to about 30 rupees, and, further, a custom and octroi or other duty of about 20 rupees, payable by a Persian, or 5 per cent. *ad valorem* by a British or other foreign merchant.—*Pharm. Journ. and. Trans.*, June 12, 1880.

CHEMICAL NOTES.

By Prof. Samuel P. Sadtler, Ph.D.

Inorganic Chemistry.—*On the Theory of Freezing-mixtures.*—A. Ditte shows that in cases where a reduction of temperature follows the mixing of a hydrated salt and an acid an anhydrous salt has been produced, and a large amount of water of hydration, previously existing in the solid form, becomes free and is liquefied. Thus, the reduction of temperature following when Glauber's salt with muriatic acid is explained by the following reaction:

$$Na_2SO_4.10H_2O+HCl=NaCl+NaHSo_4+10H_2O.$$

The author therefore sought, in verification of this hypothesis, to produce a freezing mixture by rubbing together two salts which, while possessing nearly equal thermo-chemical value (so that no heat would be developed by their reaction upon each other), should liberate in their mutual decomposition water of hydration, which would then have to become liquid. He found as an actual fact that the rubbing together of ammonium nitrate and Glauber's salt produced a diminution of temperature of about 20°C., ammonium nitrate and sodium phosphate together a loss of 18°C., and ammonium nitrate and soda a loss of 25°C.—*Compt. Rend.*, No. 90, pp. 1191 and 1282.

Detection and Determination of Chlorine in Presence of Bromine and Iodine.—G. Vortman has discovered a method by means of which even small quantities of chlorine, along with the other halogens, can be easily and quickly detected. It depends on the different behavior of the chlorides, bromides and iodides with peroxides of manganese and lead in presence of acetic acid.

Iodides are partially decomposed by the above-mentioned peroxides, even in neutral solutions, and if they are boiled with the addition of acetic acid the iodine is completely eliminated. Lead peroxide oxidizes a part of the iodine to iodic acid, but with manganese peroxide no iodic acid is formed.

In a neutral solution bromides are not decomposed either by manganese or lead peroxide. In an acetic acid solution the lead peroxide only acts, bromine escapes, but bromic acid is formed only if bromides are present in considerable quantities. Manganese peroxide has no action in the acetic acid solution, even on prolonged heating. Chlorides are not attacked by either of the peroxides in presence of acetic acid. In testing for chlorides in presence of bromides or iodides, it is suffi-

cient to boil the substance in an acetic solution with lead peroxide until the liquid, on settling, is colorless and has not the slightest odor of bromine or iodine. The bromine and a part of the iodine escape as such; the remainder of the iodine remains as lead iodate along with the excess of the lead peroxide. On filtering and washing the precipitate all the chlorine is found in the filtrate free from bromine and iodine. In this manner the chlorine may be determined quantitatively. If the quantity of chlorine accompanying the iodine is considerable manganese peroxide is preferable to lead peroxide, as otherwise the liquid must be largely diluted with water to prevent lead chloride from depositing. In determining large quantities of chlorine in presence of bromine it is well to add along with the lead peroxide some potassium sulphate, so that all the chlorine may be found in the filtrate combined with potassium. In order to expel the liberated bromine and iodine more rapidly a moderate current of air may be passed through the solution on the water-bath.—*Chem. News*, June 18, 1880.

On the Behavior of Sulphuretted Hydrogen with the Salts of the Heavy Metals.—H. Delffs calls attention to the different precipitability of the metallic salts in presence of a strong mineral acid on the one hand and of acetic acid on the other. Just as the limit between precipitable and non-precipitable salts is altered by the use of acetic acid instead of hydrochloric acid it is further modified if formates are treated with sulphuretted hydrogen. In that case the salt of zinc is precipitated, but the compounds of cobalt, nickel, iron and manganese are not affected. Manganese cannot be precipitated by sulphuretted hydrogen from propionic, butyric and valerianic solutions. In precipitations by this last reagent several metals are never simultaneously converted into the corresponding sulphides, but the precipitation ensues in such manner that one metal is first completely separated before the removal of another begins. Upon this fact is founded a very convenient method for obtaining cobalt and nickel in a state of purity. As sulphuretted hydrogen first completely precipitates cobalt acetate, and then acts upon nickel acetate, a solution of the two nitrates is mixed with sodium acetate in quantity insufficiant for complete double decomposition, and sulphuretted hydrogen is introduced so that, according to the respective proportions of the two metals, either nickel free from cobalt is obtained in solution, or cobalt free from nickel as a precipitate. The required quantity of sodium acetate may be calculated from the relative quantities of the two metals which are mostly known.—*Ibid.*, p. 279.

Organic Chemistry.—*Process for the Continuous Preparation of Acetic Ether* —J. A. Pabst has devised a process in imitation of that for the preparation of common ether. 50 cc. sulphuric acid and the same quantity of alcohol are heated together in a retort to 140°C., and then a mixture of 1 liter of 96 per cent. alcohol and 1 liter acetic acid (93 per cent.) is allowed to flow in slowly. At first some ethyl ether goes over and then a liquid which contains, with considerable uniformity, 85 per cent. acetic ether The reaction takes place between 130° and 135°; at 145° already some sulphurous acid is produced. The yield is about 1350 grams or 78 per cent., which is 90 per cent. of the theoretical amount. With reference to the solubility of acetic ether in saturated calcium chloride solution is to be remarked that pure acetic ether is not dissolved, although it is if mixed with 90 per cent. alcohol. 1 volume acetic ether, 1 volume alcohol and 2 volumes calcium chloride solution give a homogeneous liquid.

The methyl acetic ether can be prepared exactly as the ethyl compound, but in the attempt to prepare the amyl acetic ether in an analogous manner side reactions were found to interfere. In order to study the proportional power of combination possessed by the two alcohols, the author allowed a mixture of 100 cc. methyl alcohol and 100 cc. acetic acid to flow into a mixture of 50 cc. sulphuric acid and 50 cc. ethyl alcohol. The first distillates contained essentially methyl acetate and the latter pure ethyl acetate. In the flask was found remaining nearly equal amounts of sulphuric and ethyl sulphuric acids, and in addition alcohol, acetic acid and some residual ethyl acetate.—*Bull. Soc. Chim.*, vol xxxiii, pp. 350–351.

On Gelose.—Morin has studied the gelose of Payeus, contained in the so-called Chinese moss (ager agar). When its solution is cooled, even that of 1 in 500 parts of water, a colorless, transparent and stiff jelly is obtained, which, when heated with moderately strong nitric acid, yields mucic and oxalic acids. It dissolves on heating with acidified water without yielding a jelly on cooling. Its solution turns the plane of polarization to the left (a 1 per cent. solution in slighty acidified water placed in a tube 0·2 m shows —4° 15′). Boiling with weak sulphuric acid changes the rotation to the left into one of 4° 10′ to the right. The right-rotating substance so obtained reduces, with the aid of heat, alkaline copper solution, corrosive sublimate and gold chloride.

Gelose leaves 3·88 per cent. of ashes, and when air-dried contains 22·85 per cent. of moisture. When dissolved there also separates out

a flocculent mass amounting to 1·9 per cent.. Alcohol precipitates gelose, but it can not be obtained pure in this manner, as the precipitate contains some ash.—*Compt. Rend.*, No 90, pp. 924–926.

Absorption of Salicylic Acid by Wood.—Kolbe shows by a series of experiments that drinking water to which salicylic acid has been added in quantity of ·05 gram to 0·2 gram per liter when kept in wooden casks, not coated on the interior with pitch, becomes spoiled in the course of several months, owing to the complete absorption of the salicylic acid by the wood tissue. The salicylic acid, it is true, cannot be detected in the woody tissue and is therefore apparently decomposed. The salicylic acid is similarly withdrawn from wine kept for a time in wooden casks.—*Jour. f. pr. Chem.*, No. 21, p. 443.

Xanthogenic Acid a Precipitant for Albuminoids.—The preserving and antiseptic properties of carbon bisulphide and xanthogenic acid now definitely established appear, according to Ph. Zöller, to stand in a fixed connection with their behavior towards albuminoids. In fact xanthogenic acid proves to be a good precipitant for these latter. 5 to 10 drops of a 10 per cent. potassium xanthogenate solution added to 200 cc. of freshly pressed grape juice not only hinder all fermentation, but through the influence of the xanthogenic acid, liberated by the vegetable acids of the juice, all the protcin material precipitates out. This settles completely and the clear supernatant fluid, while containing the sugar in nearly unchanged amount, contains only traces of nitrogenous compounds. 75 cc. yielded on making a nitrogen determination no quantitative result. The author is still engaged in studying the character of the reaction.—*Ber. der Chem. Ges.*, vol. xiii, p. 1064.

Santonin contaminated with Strychnia.—Strychnia is stated to be a common impurity in commercial samples of santonin. Forquate Gigli recommends for its detection, in preference to Flückiger's method, the following process: 1 gram of the sample is placed in a small beaker, covered with a little distilled water and acidulated with a few drops of sulphuric acid. On agitating with a glass rod the strychnia dissolves, while the santonin remains insoluble. The liquid is filtered, the residue washed with a little water and the washing added to the filtrate, which is then distributed in several test-glasses and examined for strychnia by means of the usual reagents.—*Chem. News*, June 18, 1880, p. 283.

GLEANINGS FROM THE GERMAN JOURNALS.

By Louis von Cotzhausen, Ph.G.

A Substitution for Seneka Root is reported by E. Siebert, who claims that the substituted root had a general resemblance to seneka, without, however, possessing the characteristic peculiarities of the officinal root. The substituted root consists of dark brown (older roots) and almost yellow (younger roots) pieces, presenting like seneka a knotty, rough head, exhibiting numerous scars, showing where the stems had dropped off, and besides remnants of the latter still adhering. The pieces of root were longer and thicker than the genuine, but differed from the latter in not possessing the peculiar odor and taste, and principally in not being marked with the projecting, peculiarly twisted and contorted keel-like line, which extends along the whole length of genuine seneka. Transverse sections of the substituted and of the genuine roots greatly resembled each other. The author supposes the substituted root to be obtained from one of the many polygala species, indigenous to Central America.—*Pharm. Ztg.*, April 7, 1880, p. 208.

Sinalbin, the glucoside of white mustard seed, was isolated by Will and Laubenheimer by boiling the white mustard, previously deprived of its fat, with 85 per cent. alcohol for half an hour, expressing hot, allowing the glucoside to crystallize, washing it with carbon bisulphide, dissolving it in a little warm water, decolorizing with animal charcoal, precipitating with strong alcohol and recrystallizing the precipitate from alcohol. Sinalbin has the composition $C_{30}H_{44}N_2S_2O_{16}$, is readily soluble in water, very sparingly soluble in cold, but readily in about 3·3 parts boiling 85 per cent. alcohol; almost insoluble in absolute alcohol, and not soluble in ether and carbon bisulphide. It melts when heated, is decomposed at a higher temperature, liberating offensive-smelling vapors, is colored intensely yellow by the slightest trace of an alkali, and temporarily red by nitric acid. It reduces alkaline copper solution, and yields when boiled with soda-lye sodium sulphate and sodium sulphocyanate.—*Pharm. Ztschr. f. Russl.*, Feb. 15, 1880, p. 112.

Gardenin Resin was isolated by J. Stenhouse more than twenty years ago from the so-called "dikamale gum," the resinous exudation of Gardenia lucida, N. O. rubiaceæ, but was not analyzed satisfactorily until quite recently, when the author and Chas. E. Groves thoroughly investigated its properties, etc. The resin is yellow, crystalline, has an unpleasant odor resembling garlic, and contains 1 to 1·4 per cent.

gardenin, which is obtained by extracting with hot alcohol and putting the solution into a cool place, when it crystallizes, is purified, and then consists of dark yellow, brilliant crystals, melting at 163 to 164° and having the composition $C_{14}H_{12}O_6$.—*Ztschr. d. Allg. Oest. Apoth. Ver.*, April 10, 1880, p. 167, from *Annal. d. Chem.*

An efficacious Ergotin for hypodermic use was obtained by Finzelberg by powdering ergot freshly, removing the fatty substance by petroleum ether, then extracting with warm water (50 to 60°C.), concentrating the extraction at a very moderate temperature, separating the gummy portion with alcohol, separating the liquid by filtration, concentrating to the consistence of a thin mellago and transferring to a dialyser. The water is renewed several days in succession, and the extract, which has become a thinner liquid by absorbing water, and from which a considerable sediment has collected on the parchment-paper, is filtered and then evaporated to the consistence of a soft extract, when it answers all requirements of physicians.—*Pharm. Centralh.*, April 8, 1880, p. 123.

Thenardid, anhydrous sodium sulphate, was formerly only found in the mountains of Espartinas, near Aranjuez, in Spain, and in the desert Atacama, in Chili, but recently large quantities of it were also found in the vicinity of Barnaul (Gov. Tomsk, Siberia), and are used for preparing soda, being the best material in the world for this purpose, consisting, according to Dr. J. Biel's analysis, of sodium sulphate 99·67 per cent., sodium chloride 0·0618 per cent., water 0·2298 per cent. and insoluble (in water) matter 0·035 per cent. It is found in handsome rhombic, translucent crystals, which become cloudy by absorbing moisture when exposed to the air.—*Pharm. Ztschr. f. Russl.*, Feb. 15, 1880, p. 104.

An Extraordinary Fine and Dry Carbolic Dusting Powder, unaltered by age, containing 2½ to 3 per cent. carbolic acid, used for dusting directly on open sores and ulcers by means of bellows, the tube of which terminates in a very fine wire sieve, through which the powder is forced, is made by Prof. Bruns by melting together at a moderate heat 60·0 colophony and 15·0 stearin, allowing the mixture to cool partially, adding while still liquid 25·0 carbolic acid and reducing the whole mixture into a uniform powder by triturating carefully with 700·0 to 800·0 precipitated calcium carbonate. When this powder is to be used for preparing a dry carbolic bandage, a mixture of 40 parts carbolic acid, 45 parts colophony and 15 parts stearin is triturated into a

fine powder with precipitated chalk in the proportion of 1 to 6.—*Pharm. Ztschr. f. Russl.*, March 1, 1880, p. 146, from *Berl. Klin. Wochenschr.*

Insect Powder, colored yellow with chrome yellow, was noticed by Dr. C. Grote, whose simple method of detecting the chrome yellow consists in igniting as much of the powder as can be put on the point of a knife with saltpetre, when a yellow fused mass is obtained, which, being dissolved in water and filtered, yields in the filtrate and residue reactions respectively of chromic acid and lead. The fraudulent addition was probably not only made in order to impart a brighter yellow color to the pure insect powder, but in order to prevent the detection of other probably not yellow inert additions.—*Pharm. Ztg.*, April 7, 1880, p. 208.

Concentrated Tincture of Insect Powder (Tinctura pyrethri florum concentrata), is highly recommended as an insecticide by Finzelberg, who prepares the tincture in the proportion of 1 part Persian insect powder to 10 parts absolute alcohol, and claims that in order to prove efficient, it is necessary to scatter it by means of a perfume atomizer. When thus used in a closed room all flies soon drop dead, while scattering it over linen, etc., acts as a protection against fleas, etc.—*Pharm. Centralh.*, April 1, 1880, p. 118.

Grimault's Indian Hemp Cigarettes are highly recommended for asthma, other affections of the breathing organs and various other diseases, consist almost altogether, as the French manufacturer claims, of Indian hemp and a little saltpetre, and are far superior to the ordinary remedies, which consist of the leaves of belladonna, of nicotina, or of paper—all impregnated with saltpetre, opium, or even arsenic. An analysis, made by Dr. H. Braun, proved, however, that Grimault's cigarettes consist chiefly, in contradiction to the manufacturer's statements, of belladonna leaves, contaminated (we might almost say) with a few fragments of cannabis, and of two other species of leaves, one of which greatly resembles the leaves of epilobium.—*Ztschr. d. Allg. Oest. Apoth. Ver.*, April 10, 1880, p. 168.

The Various Colors of the Shells of Bird's Eggs are products of two coloring substances, which Wicke considers identical with *bilivirdin* and *bilirubrin*. The coloring matter consists in the outer layer of the shells, and separates in flakes when the egg-shells are moistened with hydrochloric acid. Alcohol dissolves these flakes, yielding various colored solutions: A sky-blue solution (with shells of

Turdus musicus, Sturnus vulgaris, Sylvia phœnicurus, Ardea argentea); a green solution without fluorescence (f. e. Corvus corone); a blueish-green solution with blood-red fluorescence (shells of Larus canus and ridibundus, Sterna hirundo Scolopax, Hæmatopus, Tringa); in rare cases a reddish solution with fluorescence. An attempt to isolate these coloring substances yielded sticky, dark green substances, but proved that they generally consist of a green or blue and a reddish-brown substance.—*Ztschr d. Allg. Oest. Apoth.*, April 1, 1880, p. 152, from *Ber. d. Deutsch. Chem. Ges.*

Ostrich Feathers are bleached by immersing into a solution of 4 to 5 grams potassium permanganate in 1 liter of water, to which an equally strong solution of magnesium sulphate may be added, heating to not over 60°C., washing and ultimately immersing into sulphuric acid (1 to 2° Baumé), or still better into a solution of sodium bisulphide.—*Pharm. Ztschr. f. Russl.*, March 1, 1880, p. 151, from *Polyt. Notizbl.*

Cloth, Linen, Paper, Straw, etc., can be rendered fire proof (incombustible) by immersing them into a boiling solution of pure ammonium sulphate 8 parts, ammonium carbonate 2½ parts, boracic acid 3 parts, pure borax 1·7 part and starch 2 parts, in water 100 parts.—*Pharm. Ztschr. f. Russl.*, Feb. 15, 1880, p. 120.

As an Innocent but fully as Reliable Substitute for Wickersheimer's Poisonous Preserving Fluid Hager suggests the following:

℞	Salicylic acid,	20·0
	Boracic acid,	25·0
	Potassium carbonate,	5·0
	Dissolve in hot water,	500·0
	Glycerin,	200·0
Then add	Oil cinamon, oil cloves, each 15·0, dissolved in alcohol,	500·0

This fluid is not poisonous, and possesses the desirable property of acting as an antiseptic, and also as a preventive and exterminator of moths and vermin, and is possessed of a pleasant odor. The borosalicylate may be used in connection with other solvents if desired.—*Pharm. Ztg.*, March 24, p. 178.

Cantharidal Collodion.—Lallier moistens 100·0 freshly powdered cantharides with 1 part of a mixture of 150·0 purified ether and 20·0 acetic acid, packs into a percolator, allows to macerate for 12 hours, slowly exhausts with the balance of the mixture, allows the resulting tincture to evaporate spontaneously in the open air at an ordinary temperature until it has lost $\frac{1}{10}$ of its weight, then dissolves gun-cotton in it in

the proportion of 2·25 to 100·0 tincture and adds 10 parts of castor oil and 0·5 Venice turpentine.—*Pharm. Ztschr. f. Russl.*, March 1, 1880, p. 147, from *Pharm. Ztg.*

The following New Formula for "Unguentum diachylon Hebræ" is published by A. Deringer:

Dissolve 200 grains lead acetate in 1 liter distilled water and 300 o white Marseilles soap in 1½ liter distilled warm water, filter both solutions, mix, wash the resulting precipitate frequently with distilled water, and after removing the moisture from it as much as possible, melt 1 part of it together with 1½ part best olive oil on a steam evaporating apparatus and triturate into a white, smooth salve in a mortar, which then possesses all the excellent, mild and healing properties of Hebræ's salve.—*Pharm. Ztschr. f. Russl.*, Feb. 15, 1880, p. 103.

An Elegant, Accurate and Neat Manner of Dispensing small Quantities of Mercurial Ointment is suggested by H. Huelsebusch, and consists in pouring the previously sufficiently melted ointment into glass tubes, allowing to cool, and then forcing them out of the tubes with a glass rod, when the ointment is obtained in sufficiently hard sticks, resembling lead plaster in appearance, any desirable weight of which can be readily cut off and dispensed.—*Pharm. Ztg.*, March 31, 1880, p. 195.

De Vrij's Improved Method of Preparing Fluid Extract of Cinchona is as follows: 100 grams of the powdered bark of the trunk of East India Cinchona succirubra, containing at least 6 per cent. alkaloids, are mixed with 38 grams normal hydrochloric acid and 362 grams water, and are macerated for 12 hours, at the expiration of which 20 grams glycerin are added and the whole mixture is transferred to a percolator. When the clear percolate ceases to pass clear water is passed through the percolator until the percolate is only colored, but no longer rendered cloudy by soda lye, which usually is the case before 800 grams percolate are obtained. The latter is then evaporated to 100 grams, the obtained fluid extract thus corresponding in strength to the fluid extracts of the U. S. Pharmacopœia.—*Pharm. Ztg.*, March 27, 1880, p. 187.

A Fraudulent Substitution, on a large scale, of Cinchonia muriate for Quinia sulphate is again reported by Prof. X. Landerer of Athens, Greece, who states that all the bottles were marked "Sulphate of Chinine," that the contents of several of them were analyzed by him and proved to contain not the slightest trace of quinia sulphate, that the substituted alkaloid was readily soluble in water and answered all the tests of cinchonia muriate.—*Pharm. Ztg.*, March 24, 1880, p. 178.

VARIETIES.

Hoof Ointment.—Very satisfactory results are said to have been obtained with the following ointment in the treatment of all diseases peculiar to hoofs, such as cracks, scratches, cuts, etc.:

℞	Benzoin, catechu, bone charcoal, .	each 10 parts.
Reduce to a very fine powder and add:		
	Pure carbolic acid, ...	8
	Petroleum ointment, ...	100
	Yellow wax, ...	10
Mix, with a gentle heat.		

—*Pharm. Centralh.*, Dec. 4, 1879, p. 453.

Pilocarpin in Skin Diseases.—Pick gives the result of his experience with pilocarpin in various skin diseases as follows: After a two-weeks course of pilocarpin in a case of alopecia areata, which had existed six months, there appeared fine white lanugo, and at the end of twelve weeks the growth of hair was restored. In ten cases of alopecia pityroides the result of the treatment was favorable. The writer concludes that the remedy may be depended upon to restore the growth of hair in cases where there is no strong hereditary tendency to baldness. (Consult "Courier," vol. ii, p. 356.) In a case of chronic intractable urticaria a cure was effected with one-tenth grain dose of the drug, twice daily. No effect was observed from its use in psoriasis; acute eczema was aggravated, while the chronic form was apparently benefitted under its administration. In pruritus cutaneus, and particularly in pruritus vulvæ, good results were obtained.—*Vierteljahr. f. Derm. u. Syph.*, Heft 1, 1880, from *Ibid.*

Benzoic Acid in Rheumatism.—Senator has employed this remedy in forty-six cases of polyarticular rheumatism. From a clinical point of view it much resembles salicylic acid. Salkowski attributes to it the same anti-putrescent and stronger anti-fermentative properties. In order not to irritate the primæ viæ, moderate doses are to be given at first: 10 to 12 grams (2½ to 3 drachms) of benzoic acid; or better 12 to 15 grams (3 to 3¾ drachms) of benzoate of soda. The acid was given as a powder in wafers or capsules; the benzoate in 100 to 140 grams (3 to 4 oz.) of an aromatic draught, with or without syrup.

It may be considered a specific for rheumatism, though in a less degree than salicylic acid. As a rule, the latter is more prompt in its action, though in some cases where that failed the benzoic acid succeeded. No relapses nor cardiac complications have been observed. Benzoic acid seems to have no tendency to irritate the stomach or bowels.—*Geneeskund Cour. der Nederl., La Presse Méd. Belge*, April 25, 1880, from *Ibid.*

Metaphosphoric Acid.—W. C. Grigg pronounces metaphosphoric acid a much more delicate test for albumen than nitric acid. The acid should be freshly made and dissolved without heat. A piece of about the size of a pea is to be dissolved in

a drachm of distilled water. The urine may be added to the solution or *vice versa*. If there be a trace of albumen the urine will immediately become turbid and of a milky-white color.—*Brit. Med. Journ.*, May, 1880, from *Ibid.*

Strychnia Successfully Antidoted by Hydrate of Chloral.—A case is reported in the "British Medical Journal" by George Gray, M. D., of strychnia poison successfully antidoted by chloral hydrate. The patient bought 20 grains of strychnia to poison rats with. He stirred it in a glass of whiskey and drank it all. Dr. Gray administered 2 drachms of chloral hydrate in solution, with much difficulty, but it had the desired effect. Two days afterward he was at his usual work.—*N. Carolina Med. Journ.*, July, 1880.

Quinamine.—Again the medical world has been presented with a new conception called Quinamine, said to be uncrystallizable quinia, and comprising other valuable constituents of Peruvian bark. When will this diabolism cease, and when will the traffickers in new remedyism ever let up in their schemes of crowding into the van their tiresome innovations, and endeavoring to compel physicians to prescribe and use their silly and useless nostrums? It is remarkable what untiring elasticity and inexhaustible scope some well-known and favorite drugs possess, and especially it is the case of cinchona bark. Since its introduction as a curative agent its natural features and general characteristics have been contorted into numberless and nameless shapes, with a product of fantastic alkaloids, peculiar approximations, and other active principles, until the individual notation would make a list as prolific as the tail of a comet. We have quinidia, cinchonidia, quinamina, apoquinamia, quinamidia, quinamicia, monoquimamicia, monocinchonidia, and all the twisted idioms of our extensive tongue have savored this boundless and seeming inexhaustible dish of unrelishable dialect. And now another has displayed and unfurled its feelers for patronage in this principle called Quinamine, claiming to embody all the virtues of Peruvian bark, and at an alarming low value. We trust that physicians will resent and disfavor this classic procession of meaningless remedies and give no encouragement to the missionaries sent out for their introduction; for it is through the medium of our medical men that we shall thwart the bombardment of these damaging delusions.—*Western Lancet*, July, 1880.

Chian Turpentine.—Much interest has been taken in the subject of Chian turpentine, from an important series of investigations conducted at the Queen's Hospital, Birmingham, as to a new method in the treatment of cancer by Mr. John Clay, obstetric surgeon to the hospital. This terrible malady has always been ungovernable by medical treatment, but the inquiries and experiments, led by Mr. Clay, introduce the belief that by the use of this carbo-hydrate the speedy disappearance of what is usually termed the cancerous infiltration can be obtained, and thereby the further development of the tumor arrested Doubtless every pharmacist has already learned from his books of reference that it is the product of the terebinth, pistacia terebinthus, a tree found in all parts of the Mediterranean; naturally it is of a very stiff consistence, and quite often firm and solid. It has a cloudy and sometimes opaque appearance and of a greenish-gray or greenish-yellow hue. Its odor is very

feeble, but when enclosed in a glass vessel it preserves a strong, agreeable scent analogus to that of fennel or elemi. Prof. Clay published formulæ for its administration, as pills, ethereal solution and emulsion. The pills consist of 3 grains of Chian turpentine and 2 grains of sulphur in each. These do not keep their shape well, but are said to be digestible. The ethereal solution is made by dissolving 1 ounce of the turpentine in 2 ounces of sulphuric ether, and the emulsion is directed to be made with one-half ounce of this ethereal solution, 4 ounces mucilage of tragacanth, 1 ounce simple syrup, 40 grains of sulphur and water to 16 ounces. If Dr. Clay's discovery proves all that it agrees to, Chian turpentine will soon be worth its weight in gold. The supply of this particular turpentine being limited, and the disease universal, it is difficult to say where the price will end, until other sources of supply be found or created. As a discovery it should for the present be taken *cum grano salis.—Ibid.*

The Stigmata of Maize.—We copy from the London Practitioner's translation from the "Progrès Medicale" the following on *corn-silk* as a diuretic. Some months ago we asked our readers to investigate this new remedy when the roasting-ear season came. It is now with us, and we hope some of our friends will report to us the results of their trials with it:

It is hardly a year since this remedy was first introduced into the ordinary routine of practice, and yet it may not be uninteresting to make an abstract of some of the papers which have been published in regard to it. Prof. Castan, at the Montpellier meeting, called attention to the stigmata of maize as a remedy which he had long known and which he had found to be of great use in gravel and nephritic colic. In the latter disease there ensued, after the administration of the drug, a marked decrease in the painful symptoms, and he therefore supposed that the stigmata acted less as a diuretic than as a local anesthetic. Prof. Denucé, of Bordeaux, obtained the most favorable results from its use in vesical catarrh, in which it appears to possess an elective action on the mucous membrane of the bladder. Dr. Pons, of Nérac, and Dr. Queirel, of Marseilles, had also frequently employed the stigmata of maize. M. Queirel observed that the pain was greatly alleviated in nephritic colic after the use of the remedy, but the urine was at the same time markedly increased in quantity. At the Therapeutic Society M. Constantin Paul stated that he was not convinced of the diuretic properties of the stigmata, although one of his colleagues had obtained some very striking results, the quantity of urine being in one case of dropsy increased from five to fifteen hundred grams after the ingestion of three spoonfuls of the syrup. Dr. Landrieux has arrived at the following conclusions, based on a considerable number of observations:

1. The various preparations of the stigmata of maize are of use in modifying the secretions of the urinary tracts. They may also be considered to possess a distinctly diuretic action.

2. Diureses is rapidly produced and the increase of urine is very marked after three or four days.

3. The diuretic effects are observed not only in diseases of the organs concerned in the urinary secretion, but also in the affections of the vascular system (diseases of the heart, blood vessels, etc.).

4. The pulse is regular, the arterial tension is increased, while the venous pressure is diminished.

5. The remedy produces no disturbance of the nervous or digestive systems. The tolerance of the drug is complete and absolute, while in chronic cases its administration may be continued for three to six months without inconvenience. The different results which the use of the stigmata of maize has given at the hands of different observers appears to be due in a large measure to the fact that the strength of the extract varies according to the nature of the soil, to the climate, to the time, to the mode of picking and to the manner of drying the stigmata. The formula for the preparation of the syrup is not yet fixed, since the quantity of the active principle varies in different samples of the stigmata. The Pharmaceutical Union adopts formulæ which contain in one case six and in another twelve grams of extract to the kilogram of syrup. The latter receipt is based on the assumption of a strength of 12 per cent. This quantity appears, however, to be too small, since the best samples of stigmata yield 25 to 30 per cent. of extract, or on an average 27·5 per cent. The kilogram of syrup will therefore contain 27·5 grams with this strength (27.5 pro mille). The daily dose of the syrup will be two to four spoonfuls, representing about one to two grams of the exttact. In all cases the syrup should be employed in preference to an infusion of the stigmata of maize.—*Louisville Med. News*, July 3, 1880.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

[THE following notice should have appeared in the last number, but was crowded out by other matters.]

Kansas State Pharmaceutical Association.—Pursuant to a call circulated some time ago, a convention of the druggists of the State was held in Topeka, Kansas, June 24; over fifty delegates were present, the session being held in the Court House at 11 o'clock.

A temporary organization was effected by the election of W. C. Johnson, of Manhattan, President, and F. E. Holliday, of Topeka, Secretary.

At the afternoon session a permanent organization was effected by the election of the following officers:

President, R. J. Brown, Leavenworth; First Vice President, B. W. Woodward, Leavenworth; Second Vice President, W. C. Johnson, Manhattan; Secretary, G. A. Chapman, Atchison; Assistant Secretary, F. E. Holliday, Topeka; Treasurer, J. G. Northcraft, Abilene; Executive Committee—Geo. A. Eddy, Leavenworth; J. W. Scott, Iola; H. K. Rowley, Topeka; W. A. Stamford, Florence. Delegates to American Pharmaceutical Association—G. A. Chapman, Geo. A Ferdinand, H. C. Trickey, Oscar Seitz, T. F. Sturtevant.

Much of the evening session was spent in a discussion of a proposed law to be urged for passage at the next session of the Legislature. The draft is too lengthy for publication.

A committee on legislation was appointed, as follows: B. W. Woodward, A. E. Barnes, Prof. Patrick, T. F. Sturtevant, H. D. Trickey, T. J. Bokman, Mr. Spangler and Dr. Fleming.

The committee on legislative matters presented for the consideration of the Association a line of action, as follows:

1. To procure the passage of a law restricting and defining the practice of pharmacy, similar in terms to a proposed law for the Illinois association, which accompanied the report, except that the Board of Health therein proposed be superceded by an Examining Board of five, to be appointed by the Governor out of twenty pharmacists recommended by the Association; also that a certificate of graduation from the Kansas College of Pharmacy or that of any other reputable college of pharmacy, shall entitle the holder to a certificate from the State Board.

2. The incorporation in said act of a provision that all the registered pharmacists in the State shall be authorized by law as a legitimate part of their business to sell liquors for medical, sacramental, scientific and mechanical purposes.

3. The passage of the following resolutions relative to the establishment of a Kansas college of pharmacy.

Resolved, That it is the sense of this Association that there should be in the State of Kansas a college of pharmacy for the education of young men intending to become druggists, who in the absence of such an institution are obliged to go into other States, at no small expense, to obtain that which should be furnished within the limits of our own Commonwealth.

Resolved, Therefore, that the Executive Committee of this Association be instructed to prepare and present a memorial to the Legislature of the coming winter, setting forth the present lamentable condition in relation to the dispensing of drugs, medicines and poisons, and the protection which public safety demands in this regard, and praying that body to appropriate the sum of $1,000 annually for the establishment and continuance of a chair of pharmacy and materia medica in the State university, such chair, the chair of chemistry and that of botany together to constitute the State college of pharmacy.

Mr. Leis moved that the Executive Committe be instructed to incorporate the Association, provided it is found practicable. Adopted.

The bond of J. G. Northcraft, Treasurer, was approved.

Mr. Northcraft offered a resolution to the effect that he be empowered to advance money, not exceeding $100, to the secretary with which to pay bills, he to account for the same. Adopted.

The Executive Committee recommended the election of certain absent gentlemen as members, and the convention adopted the recommendation.

Topeka was unanimously selected as the place of the next meeting.

Cincinnati College of Pharmacy.—We learn from a Cincinnati paper that a movement has been on foot for some time past looking to a consolidation of the Cincinnati College of Pharmacy with the University located in that city, and that the project received the favorable consideration of the University Board, and that it also had some strong supporters among the active members of the College of Pharmacy. Subsequently a meeting of the College was called to consider the action of the Board of Trustees, especially in the matter of electing trustees and fixing their compensation; after considerable discussion the action of the Board was annulled and the old faculty were appointed at the old salaries.

An election for four trustees was also held at the same time. Messrs. Feemster, Græger, Heun and Reum were elected.

EDITORIAL DEPARTMENT.

American Pharmaceutical Association.—We feel that the near approach of the sessions of our National Pharmaceutical Association requires a notice of the fact, and also of the most interesting matters pertaining to its usefulness and its existence.

Like every other institution, it cannot flourish without money, and this, it is well known throughout the membership of the Association, is lamentably scarce, paying its way each year only by collecting the dues of the ensuing year. It is easy to see that the state of bankruptcy cannot be far distant; yet still the auditing committees have, till last year's meeting, generally merely reported the treasurer's account correct, not even noting the fact that the balance is really made up from the dues of the coming year. Whether the action taken at the meeting last year at Indianapolis will prove to be the cure it was designed will soon be known. The action of the Association in appointing a committee to induce members of the trade to connect themselves with us, if generally responded to, will help the finances of the Association, besides giving relations to young members of the profession by which an increased interest in our calling will most naturally ensue. With a sincere hope that the best interests of the Association will be carefully considered and judiciously guarded, we urge a large attendance at Saratoga.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

An Introduction to Pharmaceutical and Medical Chemistry. By Dr. John Muter, M.A., F.C.S., F.I.C. Second edition. London: W. Baxter, Kensington Cross, S. E. Philadelphia: Presley Blakiston, 1012 Walnut street.

It is with a great deal of gratification we notice a second edition of this valuable work, and more particularly since it is a *new* edition, not a mere revise, but arranged in a manner that is quite different from the former, and, in our judgment, much better adapted to the wants of the learner.

Part I, which occupies 398 pages, is devoted to theoretical and descriptive chemistry. Chapter 1 is introductory; treats of matter in various states; analysis and synthesis; the elements and their symbols; and a preliminary notice of the four elementary substances—oxygen, hydrogen, nitrogen and carbon.

Chapter 2 treats of theories, chemical action and the modes of expressing the same by formulæ and equations. Under these theories the laws of combination are fully and most clearly explained; chemical action is next explained; combination by volume; atomicity is next treated of, and then graphic formulæ in their connection with the doctrine of atomicity. Radicals, acids and bases are in turn explained, and then the formulation of salts in connection with the knowledge of atomicity.

Chapter 3 treats of simple basylous radicals—the metals used in pharmacy—under the classes of monads, dyads, triads, tetrads, pentads.

Fluorine and chlorine, with their compounds most used in pharmacy, occupy the fourth chapter. Oxygen and its compounds, with simple basylous radicals, fill the sixth chapter. Sulphur and its compounds are treated of in Chapter 7. Carbon with its compounds are the subjects treated of in Chapter 8. Chapter 9 treats of

boron, silicon, selenium and tellurium. Chapter 10 treats of nitrogen and its compounds. Chapter 11 treats of phosphorus and its compounds; these combinations, which have become so popular in medical practice of late years, are described quite fully. Chapter 12 is devoted to the preparations of arsenic. Chapter 13 treats of the hydrocarbons and their derivatives. Chapter 14, the alcohols. Chapter 15, carbohydrates, which really belong to the alcohols. Chapter 16 treats of the organic acids. Chapter 17, the ethers. Chapter 18, the aldehyds, ketones, etc. Chapter 19 treats of ammonia derivatives. Chapter 20, the glucosides. Chapter 21, albuminous bodies.

Part II treats in the first chapter of the processes employed by the chemist in his daily work; in the second chapter, the detection and separation of the metals; in the third chapter, the detection and separation of the acidulous radicals; in the fourth chapter, qualitative analysis in examining official salts; in the fifth chapter, qualitative analysis in the detection of unknown salts; in the sixth chapter, detection of alcohols.

Chapter 7 treats of toxicology. Chapter 8, of volumetric quantitative analysis. Chapter 9, of gravimetric quantitative analysis. Chapter 10, of ultimate organic analysis. Chapter 11, of special processes in analysis.

We have thus particularly asked the attention to the above lists of contents, as so many are desirous of the succinct and withal exact methods adopted by Dr. Muter in his treatise. We can only express the hope that it will be largely used.

T. S. W.

The Skin in Health and Disease. By L. D. Bulkeley, M.D. Philadelphia: Presley Blakiston, 1012 Walnut street.

This little manual—one of the series of American Health Primers—treats of a subject upon which there is a great amount of popular ignorance, and in view of this the treatise was prepared, in the hope that its perusal would tend to correct the ignorance and show the necessity of seeking proper advice. Of course any opinion of our own upon the methods of treatment would be entirely out of place.

Supplement to the American Dispensatory. By John King, M.D., and J. U. Lloyd. Cincinnati: Wilstach, Baldwin & Co.

This is the title of a work which embodies notices of most of the new remedies selected to a great extent from the native drugs of our country. The American Dispensatory has long been regarded as an *authority* by the class of physicians who style themselves as Eclectics, and in June of last year their National Association resolved to adopt it as their standard authority. The work is a very closely printed royal octavo of 302 pages; the index has nearly, if not quite, 1,500 references; among these we note many which have lately been introduced to the attention of medical men. The work is one that should be in the library of every pharmacist who would keep himself well informed upon the new remedies which have been introduced.

The Student's Dose Book and Anatomist Combined.—Detroit: "Leonard's Illustrated Medical Journal," 1880. Price $1.

This little work is divided into two parts, the first of which, issued separately, has attained to the twenty-fifth thousand, and the second to the tenth thousand, designed evidently for the medical student. It can hardly be considered within our province to criticise.